

Psychological Monographs

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A Study of the Test-Performance of American, Mexican, and Negro Children

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PUBLISHED FOR THE AMERICAN PSYCHOLOGICAL ASSOCIATION

By THE PSYCHOLOGICAL REVIEW COMPANY

PRINCETON, N. J.

AND ALBANY, N. Y.

AGENTS: G. E. STECHERT & CO., LONDON (2 Star Yard, Carey St., W. C.)
LEIPZIG (Hospital St., 10); PARIS (76, rue de Rennes)

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I. INTRODUCTION

1. STATEMENT OF THE PROBLEM.—The problem which forms the basis for the following work is the determination of the comparative status of White, Mexican, and Negro children in respect to what has been called "native ability" or "general intelligence." White,¹ Mexican, and Negro children found in the Texas urban and rural schools were chosen for comparison. The aim of the investigation is therefore twofold: first, to make inter-racial and inter-national comparisons; and secondly, to compare the city- and rural-school populations for each race or nationality studied.

Such an aim necessitates eight distinct comparisons: 1, the city White with the city Mexican; 2, the city White with the city Negro; 3, the city Mexican with the city Negro; 4, the city with the rural White; 5, the city Mexican with the rural Mexican; 6, the city Mexican with the rural White; 7, the city Negro with the rural White; and 8, the city Negro with the rural Mexican.

At the present stage of the development of intelligence testing, one needs to be very cautious in evaluating and interpreting test-score results. Our intelligence tests are apt to measure the influence of environmental factors as well as "innate abilities." Health, home conditions, school attendance, interest, cultural traditions, etc., are determining factors in intelligence-test performance. When comparisons are to be made, furthermore, between different racial, national, and socio-economic groups,² the problem is complex indeed. There are here not only a vast complex of associated factors to be taken into account, but also the variation of these factors from group to group.

2. ACKNOWLEDGMENTS.—The data of this investigation were collected by the writers in connection with the Texas Educational

¹ In the White group we included only children of American parentage so as to obviate any possible error arising from comparing, within one group, children hearing and speaking different languages in the home.

² The term "socio-economic" is used to characterize the city-rural divisions.

Survey. A less detailed report of the findings is published as a part of the entire Survey investigation. The Survey Commission furnished the larger part of the test material, and met the writers' traveling expenses as well as the cost of scoring the tests and tabulating the results. This assistance the writers wish to acknowledge gratefully.

The authors wish also to express their appreciation of the coöperation of Professor George A. Works, Director of the Texas Educational Survey, and of the following superintendents in charge of the school systems in which the data were collected: Mr. Jeremiah Rhodes, San Antonio; Mr. A. N. McCallum, Austin; Mr. A. H. Hughey, El Paso; Miss M. Louise Jones, Karnes County; Miss Fannie Dobie, Bee County; Mr. Leon G. Halden, Travis County; Miss Wilma Allen, Hays County; Mr. W. H. McCracken, Kleberg County; Mr. Nat Benton, Nueces County.

II. THE POPULATION SAMPLES AND THE TESTS USED

Limitations both as to time and funds prevented the taking of samples from all of the cities and counties in Texas. The selection of territory was made, therefore, mainly with three points in mind: first, that we secure a fair and accurate picture of prevailing school conditions throughout the state; secondly, that the subjects be representative samples of the city- and rural-White, Mexican, and Negro children found in the elementary schools of Texas; and lastly, that the localities be near Austin, provided that they met the first two demands. San Antonio, El Paso, and Austin were chosen to furnish the city subjects; Karnes, Bee, Travis, Hays, Kleberg, and Neuces counties, the rural.

Data were collected for the various scholastic populations mentioned; but since there were few Negro schools in most of the counties visited and, in one instance, none,—because the scholastic population did not warrant any—the Negro rural data are limited in numbers. We decided, therefore, not to include the rural Negro material in the present study.

The tests employed in this investigation were four in number: specifically, the Myers Pantomime Intelligence Test; the National Intelligence Test, Scale A-Form I; the Detroit First-Grade Intelligence Test, Form A; and the Pintner-Cunningham Primary Mental Test. These tests will be described in the section dealing with the testing technique. No child was given more than two tests—the Pantomime and, in most cases, one other. Those children not subjected to a second test were the first-, second-, and certain third-grade rurals, a fifth-grade group in El Paso, and the pupils absent from school when the second test was given.

As a part of an elaborate testing program conducted in San Antonio several weeks, and in some instances several months, before the Survey movement was under way, a small group of specially trained workers had subjected all of the elementary-

school pupils in this city to one of the following tests: the National Intelligence Test, the Detroit First-Grade Intelligence Test, or the Pintner-Cunningham Primary Mental Test. The Detroit test was given to the first-graders only, the Pintner-Cunningham to the second-graders, and the National to those pupils in the third grade or above.

The test records of only those pupils to whom the writers had administered the Pantomime test were included in the present study.

The above-mentioned tests were administered before the February promotions, and the Pantomime test was given after the opening of the second semester. This fact might have resulted in considerable confusion in the grade classification of a pupil, had we not arbitrarily given him the grade ranking that was his when he was subjected to the Pantomime test. For example, though a pupil was in the high first grade when he took the Detroit test, he was classified as a second-grader, provided he was advanced in the mid-term promotions and was in the low second grade when the Pantomime test was administered. This procedure operates to make the highest half-grade sample, for these San Antonio tests, a superior one, since it is composed only of pupils who have satisfactorily completed the work of the preceding half-grade. Since, furthermore, the number of retardates is much greater in the case of the Mexicans and Negroes than in the case of the Whites, the alteration in the quality of our racial or nationality samples is likely to influence the test scores. In the interpretation of the results this fact will be brought up again.

III. THE ADMINISTRATION AND SCORING OF THE TESTS

In administering the tests the instructions of the respective authors were adhered to, and the same method of procedure was adopted by the two experimenters. Hence, the possibility of the personal equation as a determiner of divergent test-performance may be considered negligible.

With two exceptions, all of the material for this study was collected by the writers themselves. Mr. W. A. Steigler, Professor of Education in Sul Ross Teachers College, Alpine, Texas, administered the tests in El Paso. The test results contributed by the San Antonio investigators constitute the other exception. The tests given by the writers, as well as those received from El Paso, were scored and checked under the writers' supervision by students of the University of Texas. The tests given as a part of the San Antonio testing program were graded by a supervised group of public-school teachers of that city, and checked roughly by the supervisors who collected the data included in this investigation. The authors are responsible for most of the statistical work, although the faithful service of Miss Esther Thompson is worthy of mention.

IV. COMPARISON OF THE GROUPS IN TERMS OF EDUCATIONAL STATUS

That an individual is the resultant of the interplay of his inherited equipment and the stimuli from his environment, is now rather generally conceded. Strictly speaking, the two factors are so inextricably interdependent that complete isolation of either for the study of its relative effect is impossible. The only certain way to ascertain the relative effectiveness of nature and nurture upon the mental development of children is by one of two methods of approach: first, by keeping the ancestry constant and varying the environment; or second, by keeping the environment constant and allowing the ancestry to vary. An investigation whose object it is to compare large numbers of children of different races and nationalities cannot strictly adhere to either method. The hereditary factor, to be sure, varies from group to group and from individual to individual. At its best, furthermore, the requirement of the second method of study cannot be equality of environmental opportunity and school training, but only independence of widely variable opportunities and trainings. It will be obvious that our comparisons are made between groups from widely diverse economic, cultural, and social levels, and from schools of varying types. In a comparative study of the performances of different races and different nationalities, one needs, therefore, to be particularly cautious about attributing any differences in educational achievement or in intelligence-test reactions primarily to an innate or hereditary cause. For this reason, before proceeding to the presentation and discussion of test-score results, we have attempted to analyze our data from the standpoint of certain outstanding environmental differences between our groups. The influence of home conditions and the social level of the parents would certainly be factors to be considered were our analyses complete. Such data, however, are not obtainable from school records, and estimates upon the part of the teacher would necessarily be hopelessly inaccurate. The

migratory character of the Mexican and, in addition, the strong probability that the teachers' ratings would be a function of the standards and traditions prevailing among the different populations, are in themselves sufficient to indicate the impracticability of such estimates.

We have, therefore, limited ourselves to a comparison in terms of educational status as measured by grade location. We realize that scholastic achievement constitutes merely one of the objective conditions likely to influence test performance. It might even be argued by some that school progress itself reflects the very capacity our tests are supposed to tap: namely, native intelligence. It is true that we must admit that poor achievement in psychological tests or in any other activity may be accompanied by inferior scholastic attainments, yet it is not necessarily the result of that condition. The poor accomplishment in both instances may result from one and the same cause—lack of native capacity. To be sure, mental capacity is an important factor in pedagogical success; but the argument that whenever school attainments are meager, ability must be low, and *vice versa*, will always be precarious. Poor health, inadequate homes, irregular attendance, late school entrance, lack of incentive—these, as well as inherent intellectual weakness, are possible causes of slow school progress. We must bear in mind, furthermore, that pedagogical attainment, as well as proficiency in intelligence-test performance, is the complex resultant of the intermingling of these various training, economic, intellectual, and nutritional factors, and perhaps many others. Our analyses, therefore, are, in the main, in terms of gross situations rather than isolated causal factors. In our interpretations, however, we have suggested as possible influences those that seemed potent from our knowledge of conditions existing among the various populations.

1. AGE-GRADE DISTRIBUTIONS.—In order to give some idea of the relative school standing of our different subject groups, we show in Tables I to IV age-grade distributions of the pupils who took the various tests. It must not be inferred, therefore, that these distributions picture the entire scholastic populations of the

TABLE II
AGE-GRADE DISTRIBUTIONS OF THE PUPILS OF THE VARIOUS SUBJECT GROUPS TESTED WITH THE NATIONAL TEST

| Grade | Age | | | | | | | | | | | | | | | | | | | | | | | | Total | | | | | | | | | |
|--------------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|--|--|
| | 7 | | | 8 | | | 9 | | | 10 | | | 11 | | | 12 | | | 13 | | | 14 | | | | 15 | | | 16 | | | 17 | | |
| | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N | | W | M | N | W | M | N | | | |
| Low Third..... | .. | .. | 1 | .. | .. | 4 | 1 | 3 | 3 | .. | 4 | 4 | .. | 1 | 3 | 1 | .. | 5 | .. | 9 | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | | | |
| High Third..... | .. | .. | 2 | .. | 9 | 9 | 19 | 4 | 20 | .. | 9 | 19 | 8 | .. | 20 | 5 | .. | 4 | 14 | 6 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | | |
| Total Third..... | 3 | 3 | 3 | 9 | 9 | 13 | 20 | 7 | 23 | .. | 9 | 23 | 12 | .. | 1 | 23 | 6 | .. | 4 | 23 | 11 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | | |
| Low Fourth..... | .. | .. | .. | .. | 4 | 6 | 17 | 4 | 12 | .. | 25 | 10 | 11 | .. | 4 | 7 | 21 | .. | 1 | 8 | 9 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | | |
| High Fourth..... | .. | .. | .. | .. | 2 | 6 | 18 | 1 | 7 | .. | 36 | 12 | 13 | .. | 13 | 13 | 20 | .. | 2 | 7 | 14 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | | |
| Total Fourth..... | .. | .. | .. | .. | 6 | 12 | 35 | 5 | 19 | .. | 61 | 22 | 24 | .. | 17 | 20 | 41 | .. | 3 | 15 | 23 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | | |
| Low Fifth..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | | |
| High Fifth..... | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | 2 | 1 | 10 | .. | 6 | 4 | 2 | .. | 7 | 8 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| Total Fifth..... | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | 2 | 1 | 10 | .. | 6 | 4 | 2 | .. | 7 | 8 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| Low Sixth..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| High Sixth..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| Total Sixth..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| Low Seventh..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| High Seventh..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| Total Seventh..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| Total..... | 3 | 3 | 3 | 15 | 25 | 25 | 56 | 12 | 43 | 71 | 47 | 38 | 60 | 47 | 55 | 59 | 46 | 37 | 33 | 62 | 26 | 29 | 14 | 24 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Total..... | 3 | 3 | 3 | 11 | 11 | 11 | 41 | 4 | 4 | 64 | 9 | 9 | 71 | 19 | 19 | 49 | 25 | .. | 54 | 45 | .. | 32 | 47 | 18 | 18 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |

localities visited. The assumption, however, that the pupils tested are fair samplings of the scholastic population of the racial or of the national group of their particular communities, seems warranted in view of the method, previously described, of their selection.

Table I shows the age-grade distribution for all pupils tested. As will be remembered, the Pantomime test was administered to every pupil who had one of the second tests, as well as to a small group who escaped a second test. Combining all grades, we have a total of 594 urban-White children, 617 rural Whites, 613 urban Negroes, 629 urban Mexicans, and 863 rural Mexicans. It will be seen from the table that comparisons of our groups are limited to the first five grades. This limitation is due to the fact that the rural Mexican rarely attends school beyond the fifth grade; and, in fact, fifth-graders were so scarce that there is the possible danger that our small sample represents a highly selected group of Mexicans. A sixth-grade city- and rural-White group and a seventh-grade rural-White group were tested because it was necessary to go up higher in the grades in order to obtain age norms equivalent to the Negro, and especially the Mexican groups. In order to avoid the more obvious effect of a selective factor, we decided to limit our comparisons mainly to the first four grades, and when data for higher grades are presented, it is mainly because the pupils of such grades fell within the desired age limits.

All pupils were classified by ages in terms of years at their last birthday. This classification is less apt to lead to confusion and error, both on the part of the teacher and the child. The ages of our groups, then, will average six and a half, seven and a half, etc., respectively. Two statements of the age of each child were obtained, one from the teacher and one from the child himself. The teacher's statement was recorded on a special record blank along with other information, such as the amount of school experience, grade, nationality, sex, etc. This information was obtained by the teachers from the school records. The child's statement of his age was recorded on the test blank by the child himself, if he could write; if not, by the examiner or an assistant.

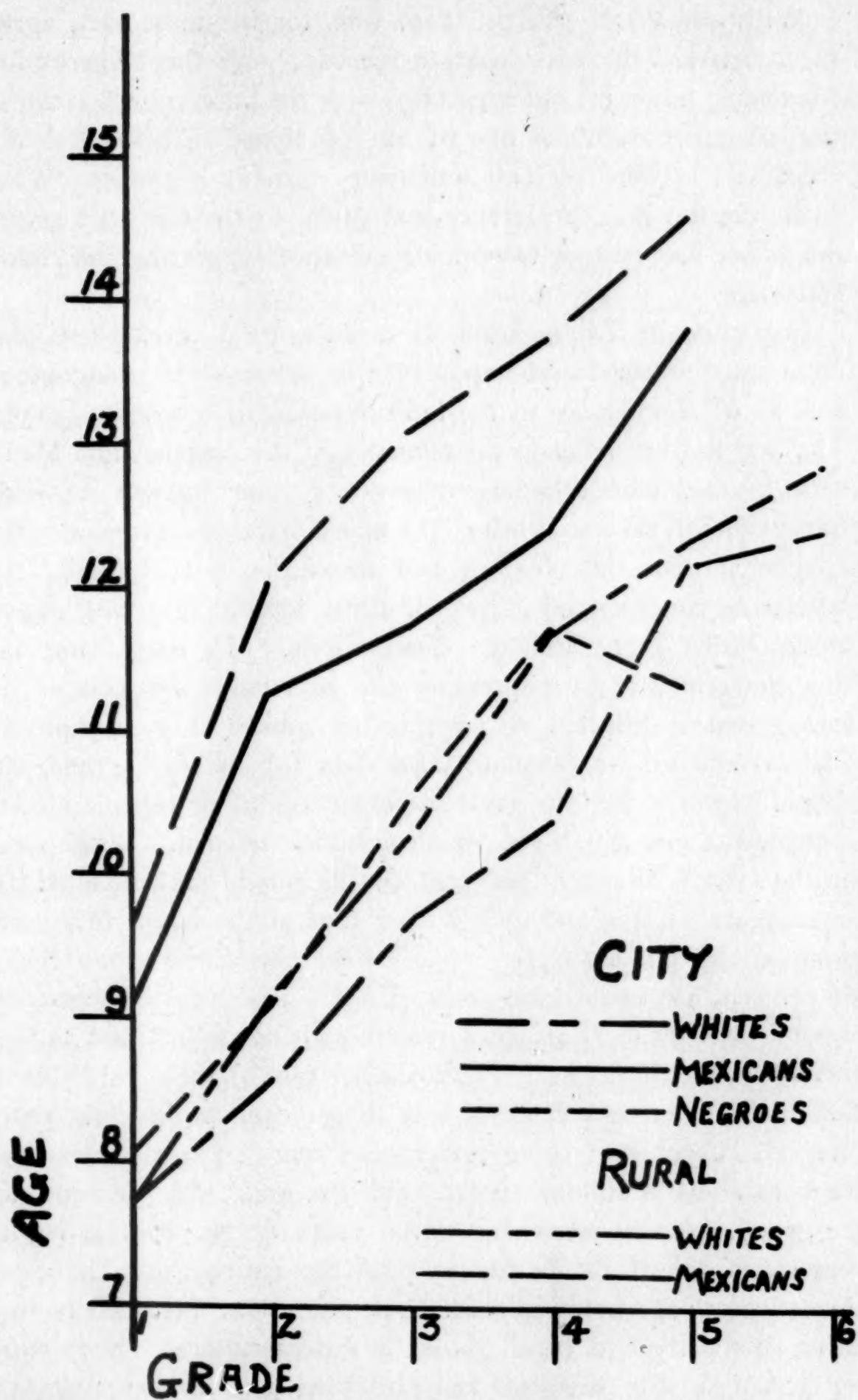


FIG. 1. Comparison of the Various Subject Groups on the Basis of Mean Age for the Different Grades.

With our White groups, there was, for the most part, agreement between the two separate records; with the Negroes and Mexicans, however, but especially with the latter, the determination of age constituted one of our problems. There were discrepancies between the two statements in many instances. When such was the case, preference was given to the teacher's record unless we had further convincing evidence supporting the child's statement.

Inspection of Tables I and II and Figure 1 reveals two phenomena of interest and importance in the field of pedagogy as well as of significance in the interpretation of test-score results. The first has reference to the tendency of the Negroes and Mexicans to distribute themselves over a greater number of scale intervals than do the Whites. In many instances, moreover, the frequencies for the Negroes and Mexicans, but especially the latter, are concentrated at two or three ages, thus giving multimodal rather than unimodal distributions. We may bring out this characteristic by expressing the percentage frequencies of each group at different ages within one grade. For example, if for convenience we calculate these data for the first grade, we should expect to find the greatest percentage of first-graders concentrated at one age, were our distribution normal. In the case of the city Whites, 69 per cent of the pupils are classified as seven years of age, and only 25 per cent of the entire first-year group are of the next higher age. Of the city-White group, then, 84 per cent are under nine years of age. The rural Whites also show a concentration at age seven, though not so marked as the corresponding city group. Fifty-one per cent of the rural Whites fall in the seven-year interval and 19 per cent in the eight-year interval, 70 per cent being under nine years of age. The city Negroes show a similar spread over the scale; 59 per cent of the group are concentrated at seven years, 16 per cent at eight years, and therefore 75 per cent of the entire group have a chronological age between seven and nine. Our Mexican population, both city and rural, shows a wider scatter. Thirty-two per cent of the city Mexicans fall within the seventh-year interval, 24 per cent within the eighth, and 20 per cent within the ninth;

TABLE III
AGE-GRADE DISTRIBUTIONS OF THE PUPILS OF THE VARIOUS SUBJECT GROUPS TESTED WITH THE DETROIT TEST

| Grade | Age | | | | | | | | | | | | | | | | | | Total | | | | | | | | | | | | |
|-------------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|----|----|-----|-----|----|
| | 5 | | | 6 | | | 7 | | | 8 | | | 9 | | | 10 | | | | 11 | | | 12 | | | 13 | | | 14 | | |
| | W | | N | W | | N | W | | N | W | | N | W | | N | W | | N | | W | | N | W | | N | W | | N | W | | N |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low First..... | .. | .. | 1 | .. | .. | 1 | 6 | 20 | 10 | 4 | 7 | 1 | 1 | 7 | 2 | .. | 1 | 6 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 11 | 37 | 15 |
| High First..... | .. | 1 | 6 | 31 | 7 | 43 | 11 | 13 | 15 | 11 | 13 | 15 | .. | 14 | 6 | .. | 8 | 6 | .. | 3 | .. | .. | .. | .. | .. | .. | .. | 42 | 50 | 79 | |
| Total First..... | .. | 1 | 7 | 37 | 27 | 53 | 15 | 20 | 16 | 15 | 20 | 16 | 1 | 21 | 8 | .. | 9 | 6 | .. | 5 | .. | .. | .. | .. | .. | .. | 1 | 53 | 87 | 93 | |
| Low Second..... | .. | .. | 3 | 10 | .. | 12 | 8 | 4 | 7 | 7 | 4 | 7 | 7 | 2 | 9 | .. | 1 | 6 | .. | 3 | 1 | .. | 3 | .. | .. | .. | .. | 25 | 15 | 38 | |
| High Second..... | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 3 | 1 | .. | 3 | .. | .. | .. | .. | 25 | 2 | 1 | |
| Total Second..... | .. | .. | 3 | 10 | .. | 13 | 8 | 4 | 7 | 7 | 4 | 7 | 7 | 2 | 9 | .. | 2 | 6 | .. | 3 | 1 | .. | 3 | .. | .. | .. | .. | 17 | 17 | 39 | |
| Total..... | .. | 1 | 10 | 47 | 27 | 66 | 23 | 24 | 23 | 8 | 23 | 17 | .. | 23 | 17 | .. | 11 | 12 | .. | 8 | 1 | .. | 7 | 2 | .. | 3 | .. | 78 | 104 | 132 | |

TABLE IV
AGE-GRADE DISTRIBUTIONS OF THE PUPILS OF THE VARIOUS SUBJECT GROUPS TESTED WITH THE PINTNER-CUNNINGHAM TEST

| Grade | Age | | | | | | | | | | | | | | | | | | Total | | | | |
|-------------------|-----|----|----|---|----|----|----|----|----|----|----|----|----|---|----|----|----|---|-------|----|-----|-----|------|
| | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | | 15 | | | |
| | W | M | W | M | W | M | W | M | W | M | W | M | W | M | W | M | W | M | | W | M | N | |
| | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | N | | N | N | N | |
| Low First..... | 4 | 19 | 2 | | 3 | 1 | | 1 | | | | | | | | | | | | | 26 | 4 | .... |
| High First..... | | | | | | | | | | | | | | | | | | | | | 26 | 4 | .... |
| Total First..... | 4 | 19 | | | 3 | 1 | | 1 | | | | | | | | | | | | | 52 | 8 | .... |
| Low Second..... | | | | | 1 | 4 | 1 | 1 | 4 | 1 | | 4 | 1 | 3 | | | | 1 | | | 2 | 21 | 4 |
| High Second..... | | 3 | 15 | 4 | 28 | 2 | 18 | 6 | 7 | 8 | 1 | 8 | 3 | 1 | | | | 1 | | | 52 | 46 | 44 |
| Total Second..... | | 3 | 15 | 4 | 29 | 6 | 19 | 7 | 11 | 8 | 5 | 12 | 4 | 4 | | | | 2 | | | 54 | 67 | 48 |
| Low Third..... | | | | | | | | | | | | | | | | | | | | | 46 | 29 | 38 |
| High Third..... | | | | | 4 | 10 | 11 | 26 | 5 | 6 | 7 | 13 | 8 | 4 | 4 | 1 | | | | | 46 | 29 | 1 |
| Total Third..... | | | | | 4 | 10 | 11 | 26 | 5 | 6 | 7 | 13 | 8 | 4 | 4 | 1 | | | | | 46 | 29 | 39 |
| Total..... | 4 | 3 | 35 | 2 | 42 | 7 | 30 | 33 | 17 | 14 | 9 | 31 | 17 | 8 | 4 | 14 | 2 | 2 | 1 | | 126 | 100 | 87 |

i.e., 76 per cent are distributed between the ages of seven and ten. The distribution of ages of the rural Mexicans exhibits a greater range than that of the corresponding city group. Thirteen per cent of the total first-grade rural-Mexican population is recorded at age seven, 17 per cent at age eight, 16 per cent at age nine, 16 per cent at age ten, 9 per cent at age eleven, and 13 per cent at age twelve. In as wide a range as five years (between the ages of seven and eleven) we find only 71 per cent of the cases, 27 per cent of the first-graders being twelve years or older.

The percentage statistics cited in the preceding paragraph are based on pupils subjected to the Pantomime test. With the National test, we obtained similar relationships—namely, the comparative regularity in distribution of the White and Negro groups and the extreme scatter of the distribution of the Mexicans, particularly the rural Mexicans.

The distributions of the pupils subjected to the Detroit and Pintner-Cunningham tests are presented in Tables III and IV. Although the number of subjects is limited, we show the distribution tables, since we use the test-score data to supplement and aid in the interpretation of other results. No conclusions are drawn as a result of group comparisons with these two tests alone.

Another point of interest suggested by the age-grade distribution data is the problem of elimination of certain of the groups with advance in the grades. Exact comparative statistics on this issue were not procurable, since in the United States Census Report all children of Mexican ancestry are classified as White. Nor have we satisfactory statistical data on this matter for any group except the rural-Mexican. Since comparison of the various subject groups was the main interest of our investigation, we attempted to obtain records for all of the scholastics of our most limited group—the rural-Mexican—and to allow the size of this group to determine roughly the size of the other groups. We cannot, therefore, safely generalize as to the comparative elimination of our groups. Our impression, however, obtained as a result of conferences with various school authorities, is that the city

Mexicans would reveal a greater amount of elimination than the city Whites.

Confining our attention to the rural-Mexican group, we may present some evidence for the scholastic elimination with advance in grade. To this group, we administered the Pantomime test throughout the first four grades; and, therefore, its grade frequencies are more nearly representative of the grade enrollment of the schools visited. Of the 863 tested, 473, or 55 per cent of the total enrollment, are in the first grade; 78, or 9 per cent, in the fourth; and only 26, or 3 per cent, in the fifth.¹ To put the matter in a slightly different way, there are only 36 per cent as many pupils in grade two as in grade one, 66 per cent as many in grade three as in grade two, 68 per cent as many in grade four as in grade three, and in the fifth grade only 33 per cent as many as in grade four.

This marked decrease in enrollment in the second and again in the fifth grade cannot be attributed entirely to the factor of elimination from school. Scholastic retardation, undoubtedly, is responsible in part for the relatively large enrollment in the first grade. This same factor may be indirectly responsible for the extreme paucity of pupils in the fifth grade. For example, if a pupil is forced to repeat a grade or two, he has reached the average working age of the rural Mexican by the time he has completed the fourth grade, and hence withdraws from school and seeks a job. Other facts argue against accepting retardation as the sole cause. We refer to a finding to be mentioned later—namely, that school experience for the first-grade rural-Mexican does not exceed that of the other groups by a large enough amount. Although we have no statistics to show the proportion of rural Mexicans who remain in school one year only, the preceding observation, together with the facts that the mode of the first-grade distribution is at twelve years and that our individual records show late school entrances, suggests strongly the possibility of early withdrawal.

In order to compare our different subject groups with respect

¹ With the rural Mexicans, tests were administered to the first five grades.

TABLE
COMPARISONS OF THE VARIOUS SUBJECT GROUPS

| Grade | Mean \pm P.E. Mean | | | Difference Between Means | | | | | |
|---------------------|----------------------|-----------------|-----------------|--------------------------|--------|--------|--------|--------|--------|
| | W | M | N | P.E. Difference of Means | | | | | |
| | | | | C W | C M | C N | C W | C M | C N |
| Low First.....C | 7.61 \pm .05 | 8.46 \pm .12 | 7.82 \pm .11 | 6.08 | 1.75 | 3.62 | .. | .. | .. |
| High First.....C | 7.82 \pm .04 | 9.73 \pm .13 | 8.18 \pm .09 | 14.69 | 3.67 | 9.69 | .. | .. | .. |
| Total First.....C | 7.71 \pm .04 | 9.10 \pm .10 | 8.06 \pm .10 | 12.64 | 3.18 | 7.43 | 0.12 | 5.17 | 2.59 |
| Total First.....R | 7.80 \pm .74 | 9.72 \pm .06 | ..... | .. | .. | .. | .. | .. | .. |
| Low Second.....C | 8.72 \pm .17 | 10.85 \pm .14 | 9.03 \pm .14 | 9.68 | 1.49 | 9.10 | .. | .. | .. |
| High Second.....C | 8.50 \pm .07 | 11.59 \pm .14 | 9.18 \pm .14 | 19.31 | 4.25 | 12.05 | .. | .. | .. |
| Total Second.....C | 8.58 \pm .08 | 11.28 \pm .11 | 9.11 \pm .10 | 19.28 | 4.42 | 14.47 | 5.00 | 5.40 | 20.43 |
| Total Second.....R | 9.23 \pm .10 | 12.09 \pm .10 | ..... | .. | .. | .. | .. | .. | .. |
| Low Third.....C | 9.53 \pm .07 | 11.90 \pm .11 | 10.31 \pm .15 | 18.23 | 5.20 | 8.26 | .. | .. | .. |
| High Third.....C | 9.93 \pm .11 | 11.59 \pm .09 | 10.77 \pm .19 | 11.86 | 3.82 | 3.90 | .. | .. | .. |
| Total Third.....C | 9.72 \pm .06 | 11.75 \pm .08 | 10.55 \pm .11 | 20.30 | 6.92 | 8.57 | 5.64 | 9.79 | 19.86 |
| Total Third.....R | 10.34 \pm .09 | 13.12 \pm .11 | ..... | .. | .. | .. | .. | .. | .. |
| Low Fourth.....C | 10.27 \pm .08 | 12.51 \pm .12 | 11.52 \pm .11 | 16.00 | 8.93 | 6.19 | .. | .. | .. |
| High Fourth.....C | 10.49 \pm .07 | 12.30 \pm .14 | 11.97 \pm .12 | 11.31 | 10.57 | 1.83 | .. | .. | .. |
| Total Fourth.....C | 10.39 \pm .05 | 12.41 \pm .10 | 11.76 \pm .09 | 18.36 | 13.70 | 5.00 | 7.55 | 8.40 | 20.00 |
| Total Fourth.....R | 11.07 \pm .07 | 13.67 \pm .11 | ..... | .. | .. | .. | .. | .. | .. |
| Low Fifth.....C | 12.15 \pm .17 | 13.85 \pm .10 | 12.14 \pm .25 | 8.50 | 0.03 | 6.33 | .. | .. | .. |
| High Fifth.....C | 12.22 \pm .11 | 13.72 \pm .12 | 12.50 \pm .23 | 9.37 | 11.20 | 4.69 | .. | .. | .. |
| Total Fifth.....C | 12.19 \pm .10 | 13.82 \pm .08 | 12.34 \pm .17 | 12.54 | 0.76 | 13.05 | 1.31 | 3.81 | 10.27 |
| Total Fifth.....R | 12.36 \pm .09 | 14.62 \pm .20 | ..... | .. | .. | .. | .. | .. | .. |
| Low Sixth.....C | 12.29 \pm .08 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| High Sixth.....C | 12.62 \pm .08 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Sixth.....C | 12.43 \pm .06 | ..... | ..... | .. | .. | .. | 4.50 | .. | .. |
| Total Sixth.....R | 12.88 \pm .08 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Low Seventh.....C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| High Seventh.....C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Seventh.....C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Seventh.....R | 14.18 \pm .09 | ..... | ..... | .. | .. | .. | .. | .. | .. |

V
ON THE BASIS OF AGE FOR THE DIFFERENT GRADES

| Median ± P.E. Median | | | Difference Between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Fre- quency | | |
|----------------------|-------------|-------------|--|------------|------------|------------|------------|------------|--------------------------|------|------|----------------|-----|-----|
| W | M | N | C C W M | C C W N | C C M N | C R W W | C R M M | R R W M | W | M | N | W | M | N |
| 7.57 ± .07 | 7.94 ± .15 | 7.59 ± .14 | 2.31 | 0.12 | 1.75 | .. | .. | .. | .59 | .96 | 1.06 | 55 | 64 | 44 |
| 7.74 ± .05 | 9.50 ± .16 | 7.80 ± .11 | 10.35 | 0.50 | 8.95 | .. | .. | .. | .47 | 1.06 | 1.29 | 53 | 66 | 91 |
| 7.65 ± .04 | 8.74 ± .12 | 7.72 ± .12 | 8.38 | 0.54 | 6.00 | 0.02 | 10.07 | 2.71 | .55 | 1.11 | 1.71 | 108 | 130 | 135 |
| 7.63 ± .93 | 10.15 ± .08 | ..... | .. | .. | .. | .. | .. | .. | 1.07 | 2.07 | .. | 94 | 473 | .. |
| 8.50 ± .21 | 10.85 ± .20 | 9.04 ± .17 | 8.10 | 2.00 | 6.96 | .. | .. | .. | 1.47 | 1.69 | 1.54 | 36 | 49 | 57 |
| 8.42 ± .09 | 11.37 ± .17 | 8.83 ± .19 | 15.53 | 1.95 | 10.16 | .. | .. | .. | .88 | 1.66 | 1.66 | 62 | 67 | 57 |
| 8.44 ± .10 | 11.14 ± .14 | 8.90 ± .13 | 15.88 | 2.87 | 11.79 | 3.87 | 5.55 | 17.11 | 1.14 | 1.71 | 1.60 | 98 | 116 | 114 |
| 9.06 ± .13 | 12.14 ± .12 | ..... | .. | .. | .. | .. | .. | .. | 1.42 | 1.85 | .. | 89 | 172 | .. |
| 9.50 ± .08 | 11.75 ± .13 | 10.18 ± .18 | 15.00 | 3.40 | 7.14 | .. | .. | .. | .78 | 1.38 | 1.80 | 62 | 79 | 69 |
| 9.69 ± .13 | 11.50 ± .12 | 10.11 ± .24 | 10.05 | 1.55 | 5.15 | .. | .. | .. | 1.18 | 1.15 | 2.05 | 56 | 70 | 74 |
| 9.58 ± .08 | 11.57 ± .10 | 10.15 ± .14 | 15.31 | 3.56 | 8.35 | 4.07 | 10.29 | 17.61 | 1.01 | 1.51 | 1.95 | 118 | 149 | 143 |
| 10.15 ± .12 | 13.32 ± .14 | ..... | .. | .. | .. | .. | .. | .. | 1.45 | 1.75 | .. | 107 | 114 | .. |
| 10.25 ± .10 | 12.58 ± .15 | 11.48 ± .15 | 12.94 | 6.83 | 5.24 | .. | .. | .. | .98 | 1.51 | 1.71 | 64 | 70 | 92 |
| 10.43 ± .09 | 12.06 ± .18 | 11.96 ± .15 | 8.15 | 9.00 | 0.43 | .. | .. | .. | .92 | 1.68 | 1.80 | 79 | 65 | 104 |
| 10.36 ± .07 | 12.36 ± .12 | 11.69 ± .11 | 14.28 | 10.23 | 4.19 | 5.64 | 8.28 | 16.88 | .95 | 1.64 | 1.77 | 143 | 135 | 196 |
| 10.98 ± .09 | 13.85 ± .14 | ..... | .. | .. | .. | .. | .. | .. | 1.23 | 1.48 | .. | 128 | 78 | .. |
| 12.29 ± .22 | 13.83 ± .12 | 12.38 ± .31 | 6.16 | 0.24 | 4.39 | .. | .. | .. | 1.15 | 1.23 | 1.23 | 20 | 76 | 11 |
| 12.17 ± .14 | 13.65 ± .15 | 12.00 ± .28 | 7.40 | 0.55 | 5.16 | .. | .. | .. | .82 | .88 | 1.25 | 25 | 23 | 14 |
| 12.22 ± .12 | 13.77 ± .10 | 12.30 ± .21 | 9.69 | 0.33 | 6.39 | 0.88 | 2.92 | 7.82 | .98 | 1.16 | 1.25 | 45 | 99 | 25 |
| 12.37 ± .12 | 14.56 ± .25 | ..... | .. | .. | .. | .. | .. | .. | 1.31 | 1.48 | .. | 87 | 26 | .. |
| 12.22 ± .09 | ..... | ..... | .. | .. | .. | .. | .. | .. | .77 | .. | .. | 48 | .. | .. |
| 12.61 ± .10 | ..... | ..... | .. | .. | .. | .. | .. | .. | .68 | .. | .. | 34 | .. | .. |
| 12.42 ± .07 | ..... | ..... | .. | .. | .. | 4.66 | .. | .. | .75 | .. | .. | 82 | .. | .. |
| 12.98 ± .10 | ..... | ..... | .. | .. | .. | .. | .. | .. | 1.03 | .. | .. | 71 | .. | .. |
| 14.23 ± .12 | ..... | ..... | .. | .. | .. | .. | .. | .. | .89 | .. | .. | 41 | .. | .. |

to their age-grade achievements, we have summarized in Table V the data presented in Table I. Columns 2 and 4 show, respectively, the means and medians with their probable errors, for our various subject groups. Column 3 shows the ratio of the difference between the mean ages of our various groups to the probable error of the difference of these means; column 5 does likewise for medians¹, Figure 1 gives a graphic representation of the mean age for the different grades of our subject groups.

In the above table and graph we have presented data for the Pantomime test groups only, because we have given this test to more subjects than we have the others. Furthermore, we have included in our Pantomime test groups all of the subjects who took the other tests. Since, for instance, the National test is not to be given to subjects below the third grade, the Pantomime age norms for the third grade or above are, for all practical purposes, the same as those for the National test.

We must not assume, however, that the ages for the different test groups will be identical, as it was not always possible to give the two tests to the same subject groups. To take an instance from the rural situation, certain third-grade pupils were found who were unable to understand enough English to comprehend the directions of the National test. When such linguistic handicaps were obvious, particular individuals, or, if necessary, entire school groups, were excluded from the examination. Again, in some of the rural schools visited there were only a few pupils who had advanced beyond the second grade, and the pressure for time did not permit the giving of the tests to so few. Occasion-

¹ These ratios serve as indices of reliability, and from them we can express the degree of the probability of a real difference between the two groups, *i.e.*, the chances of finding a difference in the same direction as the obtained one, were we to repeat the measurements with an infinite number of subjects. Thus, if the difference is once its probable error, there is 1 chance in 4 for reversal or, in other words, 3 chances to 1 that the difference is real. When the difference is twice its probable error, the chances are 9 to 1 that the true difference is in the same direction; if the difference is three times its probable error, the chances are 46 to 1; if four times, the chances are 284 to 1. (See Thorndike, E. L., *Mental and Social Measurements*, 1919.)

When the quotient is as large as 4, the difference is considered statistically reliable, although some authors regard even 3 as a significant difference.

ally, also, we found a school where there were some fourth-graders but no third- or fifth-grade children, and *vice versa*. Such irregularities as these made it impossible to keep exactly the same personnel in our various test groups. Although the number and identity of the cases in the grades varied somewhat with the different tests, the mean and median ages for the different grades varied so little that the difference may be considered negligible, and consequently the data are not shown separately.

The extreme diversity of our groups as to the average age for the grades surveyed may be revealed by showing the percentage of one group that reaches the mean of another group in a grade-for-grade comparison. Such data may be easily calculated by using Table V, which gives the grade means for the respective groups, and Table I, which gives the entire age-grade distribution. Table VI shows these data for the four grades separately, as well as the average of the combined grades.

Comparison of White and Mexican Groups. Examination of Table V reveals the fact that our group differences are in the same direction whether we calculate them on the basis of the means or medians. With the former the differences are accentuated in some cases because of the fact that the mean takes full account of the extremes of the distribution, while the median is less affected by the unusually large or small values. To take a particular instance for illustration, the median age for the first-grade city Mexicans is 8.74 years, while the mean age is 9.10 years. The mean and median for the corresponding White group, on the other hand, differ little in magnitude. Corresponding to this divergence between the two central tendencies for the Mexican group, we find the scatter of the distribution (see Table I) and, likewise, the sigma to be larger than that for the Whites. The Mexican distribution extends from age seven through age fourteen, while the range of the city Whites is from six through nine years. As the comparison of our two averages indicates, the Mexican distribution is weighted at the high end.

The comparison of Whites and Mexicans, of both city and rural groups, on the basis of age for a given grade, shows the White group, whether urban or rural, to be younger than the

corresponding Mexican group. The consistent superiority of the White groups in every grade comparison, together with the fact that the reliability quotients range from 8.38 to 20.30 for the city Whites and from 2.89 to 20.43 for the rural Whites, indicates that the difference between the groups is statistically reliable. The data of Table VI which shows the amount of overlapping

TABLE VI
GRADE COMPARISONS OF THE VARIOUS SUBJECT GROUPS ON THE BASIS OF THE PER CENT OF ONE GROUP EXCEEDING THE MEAN AGE OF ANOTHER—PANTOMIME TEST

| Comparison | Grade | | | | Av. Total |
|---|-------|--------|-------|--------|-----------|
| | First | Second | Third | Fourth | |
| Per cent of CM Reaching Mean of CW..... | 22.6 | 6.5 | 6.3 | 11.2 | 11.7 |
| Per cent of CN Reaching Mean of CW..... | 48.3 | 41.7 | 44.2 | 23.3 | 39.4 |
| Per cent of CN Reaching Mean of CM..... | 81.7 | 114.3 | 72.6 | 64.5 | 83.3 |
| Per cent of RW Reaching Mean of CW..... | 53.8 | 35.4 | 35.9 | 30.6 | 38.9 |
| Per cent of RM Reaching Mean of CM..... | 32.6 | 36.1 | 22.0 | 21.2 | 28.0 |
| Per cent of RM Reaching Mean of RW..... | 11.8 | 5.5 | 8.0 | 6.3 | 8.0 |

among the groups serve further to indicate the marked superiority of the White over our Mexican groups. With regard to the city groups, about 88 per cent of the Whites surpass, on an average, the means of the comparable Mexican group; about 92 per cent of the rural Whites excel, on the average, the means of the rural Mexicans. Or to put the results in a more striking form, 19 per cent of the first-grade city Mexicans surpass in age the mean of the fourth-grade city Whites; whereas 35.7 per cent of the rural first-grade Mexicans surpass in age the mean of the rural fourth-grade Whites. Not only does a certain percentage of the first-grade city and rural Mexican distributions surpass the central tendencies of the corresponding White groups of the fourth grade, but also 29 (6.1 per cent) rural Mexicans are older than the oldest fourth-grade rural Whites.

Concerning the variability of the groups being compared, the Mexicans, whether they be the city or rural samples, are, in the grade comparisons, consistently more variable than the corresponding White groups.

Comparison of White and Negro Groups. The mean age-grade achievement of the city Whites is less than that of the city Negroes in every instance except in the low-fifth grade, where the means are practically identical. The medians, likewise, show a superiority on the part of the Whites with two exceptions where the differences, though in favor of the Negroes, are so small that they may be considered negligible. It will be noticed, however, that our group differences are smaller for each grade than they were in the White-Mexican comparisons. Nevertheless, with the exception of the fifth grade, the reliability quotients are large enough to be significant. This diminished intergroup divergence in the fifth grade is very likely due to a selective factor operative in the case of the fifth-grade Negroes: namely, a dropping out of school of the older and retarded Negroes.¹ The results in Table VI, likewise, indicate a lesser degree of overlapping: 39.38 per cent of the city Negroes on an average reach the mean of the city Whites of equal grades. The age-grade achievement of the city Negro resembles more closely the rural-White group than that of the corresponding city sample.

Other investigators, among whom may be mentioned Mayo,² Phillips,³ Ferguson,⁴ and Peterson,⁵ also found that the Negro children tested by them were appreciably older than White children of the same school grade. School censuses indicate the same fact.

Comparing the two groups in terms of variability, the sigma of the Negro distribution is larger, grade for grade, than is the sigma of the corresponding White distribution. If we turn back to the age-grade distribution chart (Table I), it will be seen that the older Negroes distribute themselves, for all grades compared,

¹ The first four grades, it should be remembered, represent a truer sample of our various groups.

² M. J. MAYO. "The Mental Capacity of the American Negro." *Archiv. of Psychol.*, No. 28, 1913.

³ B. A. PHILLIPS. "Retardation in the Elementary Schools of Philadelphia." *Psychol. Clinic*, 6 (1912), 79-90, 107-121.

⁴ G. O. FERGUSON. "The Psychology of the Negro." *Archiv. of Psychol.*, No. 36, 1916.

⁵ J. PETERSON. "The Comparative Abilities of White and Negro Children." *Comp. Psychol. Monographs*, 1 (1922-23).

over a greater range than do the Whites. In the first two grades, moreover, the Negro range surpasses that of the White at the lower as well as the upper end of the scale. In variability, also, the Negroes show more resemblance to the rural Whites, though still consistently more variable.

Comparison of City and Rural Groups of Like Race or Nationality. The city Whites and the city Mexicans are younger than their respective rural groups in each grade comparison. That this indicated diversity is reliable is suggested both by the consistency of the tendency and the magnitude of the reliability quotients. In the case of the Whites, the reliability quotient ranges from .02 to 7.55, with a mean of 3.61; for the Mexicans, the quotient ranges from 2.92 to 10.29, with a mean at 6.97. Turning again to Table VI, we see that only 27.98 per cent of the rural Mexicans reach the mean of the rural Whites, but that 38.93 per cent of the rural Whites reach the mean of the city Whites. The vast overlapping in ages of the two Mexican populations is emphasized by the fact that 22.2 per cent of first-grade rural Mexicans are older than the mean age of fourth-grade city Mexicans. Expressed in other words, a certain percentage of the older rural first-graders overlaps the older fourth-grade city sample.

Compared in terms of variability, the rural Whites show a larger sigma than do the city Whites, and this is true for every grade. The rural-Mexican group is more variable than its corresponding urban group with the single exception of the fourth grade.

Comparison of Mexicans and Negroes. The city Mexicans are older than the city Negroes in the grade-for-grade comparison, whether we measure the central tendency in terms of means or medians. The reliability quotients are large enough to indicate significant differences, the mean quotient being 4.65. Since the city Mexicans are older for their grades than are the city Negroes, and since the rural Mexicans surpass the city Mexicans in age-grade attainment, it is evident that the rural Mexicans are considerably older for a given grade than are the city Negroes. The standard deviation of the Negro distribution is greater than that of the city-Mexican in all but one grade.

An explanation of the facts revealed in the analysis of Table VI is not easy. Even limiting the discussion to one group at a time, the complexity of the situation prevents interpretation in terms of a single causal factor. Five factors, at least, viz., late school entrance, early elimination, irregular attendance, short school term, and pedagogical retardation, must be taken into consideration. The Mexican groups have all five handicaps to contend with; and the combination and interaction of these factors no doubt account for their advanced age throughout the grades.

The high variability of the Mexican and Negro groups, as compared with the White, is a further indication of the complexity brought about by the prevailing socio-economic condition for certain of our populations. The fact that the high variability of the rural-Mexican group is most marked in the first grade, together with the analysis of the first-grade distribution (Table I), suggests that, at least in the case of the rural Mexican, late school entrance is an important retarding factor. The standard deviation of the Negro distribution, on the other hand, is large for all of the grades except the fifth, where the cases are few and unrepresentative. This fact, together with the data of the age-grade distribution chart, eliminates the factor of late school entrance as a cause of the high variability. The situation in the Negro group is more likely due to the operation of the factors of pedagogical retardation and irregular attendance or, perhaps, to still other unmentioned factors.

2. AMOUNT OF SCHOOL EXPERIENCE FOR THE DIFFERENT AGES AND GRADES.—An analysis of the school experience of our groups will throw further light upon the problem of environmental differences. To be sure, just as the age attainment for a particular grade is in large part a resultant of mental ability, so also is the amount of school experience that is acquired dependent upon native endowment. Thus, with all other conditions equal, in a comparison of two races or nationalities, that one showing the greater amount of school experience for a particular grade may be considered the less intelligent. With our groups, however, we cannot assume equality of conditions; yet, on the other

TABLE
COMPARISONS OF THE VARIOUS SUBJECT GROUPS ON THE BASIS

| Age | | Mean \pm P.E. Mean | | | Difference Between Means P.E. Difference of Means | | | | | |
|-----|--------|----------------------|------------------|------------------|--|-------|------|------|------|-------|
| | | W | M | N | C C | | C C | | C C | |
| | | | | | W M | W N | M N | C R | C R | R R |
| | | | | | | | | W W | M M | W M |
| 6 |C | 1.60 | ..... | 8.39 \pm .50 | .. | .. | .. | .. | .. | .. |
| |R | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| 7 |C | 5.97 \pm .32 | 6.45 \pm .44 | 7.78 \pm .41 | 0.89 | 3.49 | 2.22 | 6.73 | 1.09 | 6.59 |
| |R | 9.20 \pm .36 | 5.84 \pm .36 | ..... | .. | .. | .. | .. | .. | .. |
| 8 |C | 15.71 \pm .49 | 11.15 \pm .59 | 16.76 \pm .57 | 5.92 | 1.40 | 6.84 | 2.16 | 3.87 | 8.37 |
| |R | 14.09 \pm .57 | 8.40 \pm .39 | ..... | .. | .. | .. | .. | .. | .. |
| 9 |C | 24.70 \pm .37 | 15.57 \pm .64 | 22.23 \pm .67 | 12.34 | 3.21 | 7.16 | 1.80 | 4.54 | 13.69 |
| |R | 23.35 \pm .65 | 11.71 \pm .56 | ..... | .. | .. | .. | .. | .. | .. |
| 10 |C | 30.91 \pm .41 | 22.19 \pm .58 | 23.97 \pm .84 | 12.28 | 7.46 | 1.72 | 5.68 | 9.86 | 15.62 |
| |R | 26.93 \pm .57 | 13.81 \pm .62 | ..... | .. | .. | .. | .. | .. | .. |
| 11 |C | 38.90 \pm .74 | 23.78 \pm .78 | 31.91 \pm .77 | 14.00 | 6.53 | 7.46 | 5.92 | 6.66 | 15.71 |
| |R | 33.10 \pm .72 | 16.45 \pm .78 | ..... | .. | .. | .. | .. | .. | .. |
| 12 |C | 46.60 \pm .92 | 22.05 \pm .97 | 31.94 \pm 1.12 | 18.32 | 10.11 | 6.68 | 7.52 | 4.42 | 19.54 |
| |R | 37.57 \pm .77 | 16.66 \pm .74 | ..... | .. | .. | .. | .. | .. | .. |
| 13 |C | 50.03 \pm 1.36 | 27.91 \pm 1.15 | 37.92 \pm 1.41 | 12.43 | 6.18 | 5.50 | 4.28 | 3.85 | 16.98 |
| |R | 42.76 \pm 1.01 | 21.36 \pm .76 | ..... | .. | .. | .. | .. | .. | .. |
| 14 |C | ..... | 22.13 \pm 2.06 | 36.79 \pm 1.97 | .. | .. | 5.14 | .. | 1.09 | 12.16 |
| |R | 48.62 \pm 1.67 | 24.66 \pm 1.05 | ..... | .. | .. | .. | .. | .. | .. |
| 15 |C | ..... | 11.07 | ..... | .. | .. | .. | .. | 7.18 | .. |
| |R | ..... | 27.31 \pm 1.79 | ..... | .. | .. | .. | .. | .. | .. |

VII
OF SCHOOL EXPERIENCE (IN MONTHS) FOR THE DIFFERENT AGES

| Median ± P.E. Median | | | Difference Between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Fre- quency | | |
|----------------------|--------------|--------------|--|--------|--------|--------|--------|--------|--------------------------|-------------|-------------|----------------|-----|----|
| W | M | N | C W | C M | C N | C W | C M | C N | C R W | C R M | C R N | W | M | N |
| 1.60 | ..... | 7.00 ± .74 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 18 |
| 6.04 ± .40 | 5.50 ± .55 | 5.50 ± .51 | 0.78 | 0.83 | 0.00 | 2.95 | 1.03 | 4.82 | 4.80 | 4.25 | 5.80 | 103 | 42 | 93 |
| 7.81 ± .45 | 4.77 ± .45 | ..... | .. | .. | .. | .. | .. | .. | 4.00 | 4.01 | .. | 57 | 57 | .. |
| 16.00 ± .61 | 11.50 ± .74 | 15.70 ± .71 | 4.69 | 0.32 | 4.12 | 1.02 | 5.06 | 9.36 | 7.18 | 5.68 | 7.62 | 98 | 42 | 81 |
| 15.05 ± .71 | 7.00 ± .49 | ..... | .. | .. | .. | .. | .. | .. | 5.52 | 5.26 | .. | 43 | 82 | .. |
| 25.00 ± .46 | 15.25 ± .81 | 20.96 ± .85 | 10.48 | 4.21 | 4.88 | 0.90 | 4.86 | 14.99 | 6.01 | 7.27 | 8.89 | 122 | 58 | 79 |
| 24.29 ± .65 | 10.05 ± .70 | ..... | .. | .. | .. | .. | .. | .. | 6.58 | 7.89 | .. | 73 | 91 | .. |
| 33.05 ± .52 | 23.50 ± .73 | 26.50 ± 1.05 | 10.73 | 5.60 | 2.34 | 6.65 | 10.75 | 14.48 | 5.87 | 8.13 | 10.53 | 92 | 88 | 72 |
| 27.20 ± .71 | 12.00 ± .78 | ..... | .. | .. | .. | .. | .. | .. | 7.33 | 9.66 | .. | 76 | 110 | .. |
| 39.00 ± .93 | 23.77 ± .98 | 31.75 ± .96 | 11.28 | 5.45 | 5.82 | 4.65 | 6.30 | 13.47 | 9.04 | 9.79 | 9.45 | 68 | 71 | 69 |
| 33.00 ± .90 | 15.08 ± .98 | ..... | .. | .. | .. | .. | .. | .. | 9.07 | 10.65 | .. | 72 | 85 | .. |
| 49.75 ± 1.15 | 23.10 ± 1.22 | 32.44 ± 1.41 | 15.86 | 9.51 | 5.02 | 7.33 | 4.23 | 16.63 | 10.78 | 10.65 | 11.54 | 63 | 55 | 48 |
| 38.75 ± .96 | 16.63 ± .93 | ..... | .. | .. | .. | .. | .. | .. | 8.72 | 11.28 | .. | 59 | 106 | .. |
| 52.00 ± 1.70 | 28.00 ± 1.44 | 34.75 ± 1.77 | 10.76 | 7.04 | 2.96 | 4.01 | 4.94 | 15.19 | 11.40 | 11.58 | 12.01 | 32 | 46 | 33 |
| 43.50 ± 1.26 | 19.50 ± .95 | ..... | .. | .. | .. | .. | .. | .. | 11.25 | 11.62 | .. | 57 | 106 | .. |
| ..... | 19.00 ± 2.58 | 32.88 ± 2.46 | .. | .. | 3.90 | .. | 0.99 | 12.40 | .. | 12.21 | 12.01 | .. | 16 | 17 |
| 52.50 ± 2.09 | 21.88 ± 1.32 | ..... | .. | .. | .. | .. | .. | .. | 17.51 | 14.21 | .. | 50 | 83 | .. |
| ..... | 9.34 | ..... | .. | .. | .. | .. | 4.81 | .. | .. | 5.45 | .. | .. | 7 | .. |
| ..... | 23.00 ± 2.25 | ..... | .. | .. | .. | .. | .. | .. | .. | 16.82 | .. | .. | 40 | .. |

TABLE
COMPARISONS OF THE VARIOUS SUBJECT GROUPS ON THE

| Grade | Mean \pm P.E. Mean | | | Difference Between Means P.E. Difference of Means | | | | | |
|---------------------|----------------------|------------------|------------------|--|------------|------------|------------|------------|------------|
| | W | M | N | C C W M | C C W N | C C M N | C R W W | C R M M | R R W M |
| Low First.....C | 4.13 \pm .34 | 6.56 \pm .48 | 3.47 \pm .25 | 4.19 | 1.65 | 5.72 | .. | .. | .. |
| High First.....C | 6.52 \pm .24 | 10.36 \pm .44 | 7.74 \pm .33 | 7.68 | 3.05 | 4.76 | .. | .. | .. |
| Total First.....C | 5.23 \pm .22 | 8.38 \pm .35 | 6.29 \pm .27 | 7.68 | 3.03 | 4.86 | 7.94 | 0.15 | 1.55 |
| Total First.....R | 9.20 \pm .45 | 8.44 \pm .21 | ..... | .. | .. | .. | .. | .. | .. |
| Low Second.....C | 12.61 \pm .56 | 16.29 \pm .43 | 14.27 \pm .53 | 5.26 | 1.86 | 2.97 | .. | .. | .. |
| High Second.....C | 16.02 \pm .19 | 22.55 \pm .90 | 12.99 \pm .29 | 7.10 | 8.66 | 10.17 | .. | .. | .. |
| Total Second.....C | 14.79 \pm .26 | 20.03 \pm .58 | 13.68 \pm .32 | 12.78 | 2.71 | 9.62 | 5.41 | 3.21 | 0.33 |
| Total Second.....R | 17.82 \pm .49 | 18.09 \pm .49 | ..... | .. | .. | .. | .. | .. | .. |
| Low Third.....C | 23.45 \pm .34 | 25.52 \pm .53 | 22.33 \pm .42 | 3.34 | 2.07 | 4.69 | .. | .. | .. |
| High Third.....C | 28.59 \pm .66 | 27.08 \pm .57 | 27.76 \pm .67 | 1.73 | 0.88 | 0.77 | .. | .. | .. |
| Total Third.....C | 25.89 \pm .39 | 25.79 \pm .39 | 25.29 \pm .38 | 0.18 | 1.11 | 0.92 | 0.86 | 2.61 | 2.00 |
| Total Third.....R | 25.39 \pm .44 | 23.83 \pm .65 | ..... | .. | .. | .. | .. | .. | .. |
| Low Fourth.....C | 31.04 \pm .52 | ..... | 31.29 \pm .66 | .. | 0.30 | .. | .. | .. | .. |
| High Fourth.....C | 33.36 \pm .48 | ..... | 34.02 \pm .40 | .. | 1.06 | .. | .. | .. | .. |
| Total Fourth.....C | 32.32 \pm .36 | ..... | 33.11 \pm .40 | .. | 1.46 | .. | 2.83 | .. | 0.99 |
| Total Fourth.....R | 30.68 \pm .46 | 30.27 \pm .86 | ..... | .. | .. | .. | .. | .. | .. |
| Low Fifth.....C | 44.95 \pm 1.11 | ..... | 45.23 \pm 2.33 | .. | 0.11 | .. | .. | .. | .. |
| High Fifth.....C | 45.30 \pm 1.49 | ..... | 50.86 \pm 1.10 | .. | 3.01 | .. | .. | .. | .. |
| Total Fifth.....C | 45.14 \pm .96 | ..... | 48.38 \pm 1.25 | .. | 2.06 | .. | 6.46 | .. | 1.36 |
| Total Fifth.....R | 37.65 \pm .65 | 34.56 \pm 2.18 | ..... | .. | .. | .. | .. | .. | .. |
| Low Sixth.....C | 45.44 \pm .78 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| High Sixth.....C | 49.17 \pm 1.68 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Sixth.....C | 46.96 \pm .84 | ..... | ..... | .. | .. | .. | 2.26 | .. | .. |
| Total Sixth.....R | 44.26 \pm .92 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Low Seventh.....C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| High Seventh.....C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Seventh.....C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Seventh.....R | 52.84 \pm .98 | ..... | ..... | .. | .. | .. | .. | .. | .. |

VIII
BASIS OF SCHOOL EXPERIENCE FOR THE DIFFERENT GRADES

| Median ± P.E. Median | | | Difference Between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Fre- quency | | |
|----------------------|------------|------------|--|------------|------------|------------|------------|------------|--------------------------|-------|-------|----------------|-----|-----|
| W | M | N | C C W M | C C W N | C C M N | C R W W | C R M M | R R W M | W | M | N | W | M | N |
| 2.40±.43 | 5.44±.60 | 2.62±.31 | 4.16 | 0.40 | 4.12 | .. | .. | .. | 3.72 | 3.83 | 2.28 | 54 | 64 | 39 |
| 5.40±.30 | 10.50±.55 | 5.81±.42 | 8.22 | 0.79 | 6.80 | .. | .. | .. | 2.58 | 5.19 | 4.28 | 52 | 64 | 76 |
| 4.83±.28 | 7.33±.43 | 5.29±.33 | 4.90 | 1.07 | 3.78 | 4.45 | 0.04 | 0.45 | 3.38 | 5.81 | 4.23 | 106 | 128 | 115 |
| 7.59±.56 | 7.31±.26 | ..... | .. | .. | .. | .. | .. | .. | 5.80 | 6.27 | .. | 77 | 411 | .. |
| 10.81±.71 | 16.75±.54 | 14.08±.67 | 6.67 | 3.37 | 3.10 | .. | .. | .. | 4.95 | 4.30 | 5.75 | 35 | 46 | 53 |
| 15.96±.24 | 21.00±1.12 | 11.09±.37 | 4.42 | 10.82 | 8.40 | .. | .. | .. | 2.20 | 10.43 | 2.90 | 62 | 62 | 45 |
| 15.65±.33 | 18.40±.72 | 13.00±.40 | 3.48 | 5.10 | 6.58 | 0.01 | 0.60 | 2.52 | 3.82 | 8.87 | 4.70 | 97 | 108 | 98 |
| 15.64±.61 | 17.83±.62 | ..... | .. | .. | .. | .. | .. | .. | 5.97 | 9.09 | .. | 68 | 156 | .. |
| 22.59±.43 | 27.14±.66 | 20.22±.53 | 5.83 | 3.48 | 8.24 | .. | .. | .. | 3.90 | 5.09 | 4.76 | 60 | 42 | 58 |
| 27.29±.82 | 25.75±.71 | 27.00±.84 | 1.42 | 2.48 | 1.14 | .. | .. | .. | 7.17 | 5.05 | 8.36 | 54 | 36 | 70 |
| 25.22±.49 | 26.00±.48 | 23.00±.47 | 1.15 | 3.26 | 4.48 | 0.30 | 3.72 | 2.55 | 6.24 | 5.05 | 6.35 | 114 | 78 | 128 |
| 25.00±.56 | 22.50±.81 | ..... | .. | .. | .. | .. | .. | .. | 6.39 | 9.75 | .. | 94 | 103 | .. |
| 30.25±.65 | ..... | 28.25±.83 | .. | 1.90 | .. | .. | .. | .. | 6.14 | .. | 8.01 | 63 | .. | 67 |
| 33.83±.60 | ..... | 32.64±.50 | .. | 1.52 | .. | .. | .. | .. | 6.29 | .. | 5.48 | 78 | .. | 85 |
| 33.45±.45 | ..... | 32.38±.50 | .. | 1.60 | .. | 2.49 | .. | 1.93 | 6.33 | .. | 7.28 | 141 | .. | 152 |
| 31.63±.58 | 29.25±1.08 | ..... | .. | .. | .. | .. | .. | .. | 6.73 | 11.06 | .. | 97 | 75 | .. |
| 43.43±1.39 | ..... | 48.50±2.92 | .. | 1.57 | .. | .. | .. | .. | 7.35 | .. | 11.41 | 20 | .. | 11 |
| 45.56±1.86 | ..... | 50.50±1.38 | .. | 2.14 | .. | .. | .. | .. | 11.02 | .. | 6.12 | 25 | .. | 14 |
| 45.06±1.21 | ..... | 50.44±1.57 | .. | 2.72 | .. | 3.91 | .. | 2.94 | 9.57 | .. | 9.28 | 45 | .. | 25 |
| 39.50±.82 | 31.33±2.65 | ..... | .. | .. | .. | .. | .. | .. | 8.06 | 15.70 | .. | 68 | 25 | .. |
| 43.50±.98 | ..... | ..... | .. | .. | .. | .. | .. | .. | 8.00 | .. | .. | 48 | .. | .. |
| 52.43±2.11 | ..... | ..... | .. | .. | .. | .. | .. | .. | 14.30 | .. | .. | 33 | .. | .. |
| 49.83±1.05 | ..... | ..... | .. | .. | .. | 2.95 | .. | .. | 11.16 | .. | .. | 81 | .. | .. |
| 45.25±1.15 | ..... | ..... | .. | .. | .. | .. | .. | .. | 9.66 | .. | .. | 50 | .. | .. |
| 52.38±1.23 | ..... | ..... | .. | .. | .. | .. | .. | .. | 7.82 | .. | .. | 29 | .. | .. |

hand, we must not overlook the possibility of innate capacity being a cause of the diversity in school-experience records.

In the preceding section we have shown that our groups differ in their age-grade attainments. For this reason separate age and grade comparisons seem advisable. When the school-experience data are compared by ages, the White pupils will be of the higher school grade; when the data are compared by grades, the Mexicans and Negroes will be of greater age. In the former case, any possible advantage will be on the side of the Whites, since they are younger for their respective grades; in the latter case, it will be on the side of the Mexicans and Negroes, since in the grade comparisons these groups are favored by their greater age for a given grade. Accordingly, we have asked ourselves the questions as to how our samples differ on the basis of school experience for each age and for each grade included in the investigation. Tables V and VI show, respectively, the amounts of school experience of our groups, recorded in months, for the various ages and grades.

Again, our calculations are based on the records of subjects who took the Pantomime test. With the National test, the school experience of certain groups, calculated on the basis of age, will average a little higher. This applies particularly to the rural-Mexican groups. It will be remembered that, in discussing an earlier table, mention was made of the fact that in some of the rural-Mexican schools the National test could not be given because of a linguistic handicap on the part of the third- and sometimes even fourth-graders. For this reason, there was a certain amount of selection in the rural-Mexican groups to whom the National tests were administered, thus tending on the whole to favor these groups.

Comparison of White and Mexican Groups. In the age comparisons the city Mexican has, with the single exception of age seven, less school experience than the city White. The rural Mexican also has less school experience than the rural White, and this is true for each age. Furthermore, the discrepancy between the groups, whether we consider the urban or rural samples, tends to increase with advance in age. That these differ-

ences are statistically significant is indicated by the fact that in both the city and rural comparisons, the reliability quotients are, with one exception for age seven, greater than four. This is true whether our calculations are based on the means or medians. Our grade comparisons, of either urban or rural subjects, reveal less pronounced and less consistent differences than do the age comparisons. For example, the city Mexican has slightly more experience than the city White in the first two grades, whereas there is practical equality in the third; the rural White, on the other hand, surpasses by a small amount its respective urban group in the first two grades but falls below in the others.

The superiority of the White over its corresponding Mexican group may be shown in another way. Upon the assumption that our distributions are approximately normal, we may express the ratio of the mean differences between the groups to the probable error of the distribution of either group, and, by the aid of a probability table,¹ calculate the percentage of one group equaling or surpassing the mean of the other. Selecting the age at which the school-experience divergence for the two groups is greatest—namely, age twelve—we find that 98.81 per cent of the city Whites surpass the means of the corresponding Mexican group, and 84.41 per cent of the rural Whites are superior in school experience to the rural Mexicans.

Even at age eight, where the intergroup comparison shows a smaller difference than in the later years, 79.91 per cent of the city Whites surpass the mean of the city Mexicans, and 84.41 per cent of the rural Whites surpass the mean of the corresponding Mexican sample.

The results of the grade comparisons, though less striking than those of age, reveal a reversed relationship. Calculating for the grade showing the greatest difference between the groups, grade two, we find that 71.68 per cent of the city Mexicans have been in school a greater number of months than have the city Whites. Grade three shows practically no group divergence, while the first

¹ See H. O. RUGG, *Statistical Methods Applied to Education* (Boston, 1917), p. 391. If there is no difference between two groups, 50 per cent of one group will surpass the mean of the other.

grade favors the city Whites. The rural White, however, excels the rural Mexican in school experience in the three grades.

The age-by-age variability comparisons show higher sigmas for the city Mexicans in four out of seven possibilities, and the grade comparisons likewise show greater variability in two out of three possibilities. The rural Mexican has a higher sigma in six out of eight age possibilities, and in the five grades admitting of comparison.

Comparison of Whites and Negroes. Observation of Table VII indicates that the direction of the difference between the White and Negro groups in amount of school experience for the different ages varies, depending upon whether we base our calculations on the means or medians. With the medians, the Whites excel at every age; with the means, however, there are two exceptions, namely, ages seven and eight. This lack of agreement between the two measures is probably to be accounted for by a few cases of Negroes who entered school comparatively early. It will be remembered that Table I showed a greater number of five- and six-year-old Negroes than Whites. If we omit the first two years, however, the reliability quotients range between 3.21 and 10.11 and thus indicate significant differences. For the first two years, however, the ratios are positive, but too small to be statistically reliable when calculated on the basis of the median differences; they are negative, though small, when calculated on the basis of the mean differences.

The grade-by-grade comparison reveals no consistent superiority of either group, whether we use the mean or the median as a measure of central tendency. The reliability quotients, whether positive or negative, are, for the most part, smaller than three, and hence have little statistical reliability.

With respect to variability, the intergroup comparisons show a consistent tendency, the Negroes exhibiting the larger sigmas for each age and for each grade.

Comparison of City and Rural Groups of Like Race or Nationality. With the exception of age seven, the rural Whites have less school experience for each age than have the city Whites, whether we base our generalization on the mean or median differ-

ences. The reliability quotient ranges from .90 to 7.52, being larger than 4.0 in eleven out of fourteen possibilities. The grade comparisons, on the other hand, reveal no consistent superiority of one group over the other, and the reliability quotients are conspicuously smaller than those of the age comparisons.

If we compare the two groups in variability, we again find that the same generalization does not hold for the two standards of measurement—namely, age and grade. In the age comparisons, the city Whites are more variable at four age levels, the rural Whites at three; whereas in the grade comparisons the rural Whites are consistently more variable.

The city Mexicans surpass the rural Mexicans in amount of school experience in the age-for-age comparisons with one exception—in the case of the median comparison for age seven. The reliability quotients range from 1.03 to 10.75 for the ages of seven to fourteen, and are greater than three at all but the seventh year. Again, the grade differences are smaller and are not consistently in the same direction. It is significant to note, also, that in both the age and grade comparisons there is a greater diversity between the city Whites and city Mexicans than between the city and rural samples of the Mexican populations.

The sigmas of the city-Mexican distribution are slightly less than those of the rural-Mexican for ages seven and eight, but for the older ages the relationship is reversed. In the grade comparisons the rural Mexicans show larger sigmas throughout.

Comparison of Mexican and Negro Groups. The age-for-age comparison shows the Negro to be consistently older than the city Mexican with the exception of age seven, where the median scores are identical. The reliability quotients range from 0 to 7.46, with a central tendency between 4.0 and 5.0. Although the quotients are not large enough at certain age levels to be statistically reliable, the consistency of the tendency, together with the marked diversity at a few age levels, adds significance to the results. The grade comparisons, on the other hand, reveal larger school-attendance records for the Mexican group; and in five out of six possibilities the reliability quotients are greater than three. If we compare the two groups in terms of variability, it will be

seen that the sigmas of the Negro distributions are the higher in six out of eight age comparisons, but in only one out of three grade comparisons.

In the analysis of our school-experience data certain relationships seem stable enough to admit of generalization. In other instances the evidence is contradictory, and without further data final statements are inadvisable. The interpretations offered are also tentative, as we realize that the possibilities of causal factors are infinite, whereas we suggest only a few which themselves are complex and perhaps resultants of the interplay of innumerable other factors.

As a first point worthy of consideration we have the fact that certain groups—namely, the Negro, but more particularly the Mexican—have considerably less school experience than the corresponding White group, provided this comparison is made on the basis of school experience at successive age levels. The amount of agreement between the two factors of age and school experience for the various subject groups may be shown in another way—namely, by the use of a correlation method. For the city groups the correlations between age and school experience are $.90 \pm .03$ for the Whites, $.69 \pm .01$ for the Negroes, and $.49 \pm .02$ for the Mexicans; for the rural groups, the correlations are $.71 \pm .02$ for the Whites, and $.48 \pm .02$ for the Mexicans. This method of approach, it may be seen, reveals the same general fact—the superiority of the White over the Mexican and Negro groups, as well as of the city over the corresponding rural groups.

Although the city Mexican and Negro have spent less time in school than urban-White children when compared in terms of age, and the rural groups less than their respective city samples, nevertheless a grade comparison would not necessarily reveal the same tendency. The groups mentioned above as inferior in school experience, it will be remembered, are also the older for their grades. This factor of age retardation, if operative alone, might be expected to increase the size of the school-experience records of all of the over-age groups. Thus, if all other conditions were equal, and we were to compare different subject groups of the same age and in the same grade, our differences would be consid-

erably greater. The city Mexican serves to illustrate the effect of this tendency. However, with certain of our grade groups, other factors acting along with this one, tend to work toward an opposite result—namely, to reduce the school-experience records. We refer to such factors as short school term, failure to maintain strict enforcement of the attendance laws, late school entrance, etc.

That superior educational advantages, other than those pertaining directly to instruction, accompany the larger and better organized school systems, cannot be doubted. The fact that the differences between the city Whites and city Mexicans are larger than those between the same races in the rural localities might be interpreted in terms of a diversity in school systems. The city Mexican attends a school that maintains the same, or nearly the same, standards as the city-White school and that also offers the same length of school term. Therefore, it is not surprising to find that the city-Mexican children require more school experience than the city-White in order to reach the latter's higher standard. Our rural-Mexican subjects, on the other hand, have been drawn from a variety of school systems of different degrees of organization. It is safe to say, however, that, as a whole, the rural-Mexican schools fall far below the standards of the city-White schools and, in most instances, are even inferior to those of the rural Whites. Besides a short school term, the rural Mexican is kept out of school for varied and sundry reasons. Therefore, because in the grade comparisons the amount of school experience of the rural Mexican does not differ greatly from that of the rural White, and, in fact, is less in two out of three comparisons, we cannot interpret this to mean that the rural Mexican requires comparatively less schooling; it means rather that he is getting less.

At this point it seems apropos to comment upon certain aspects of the school situation of the rural Mexican, because they are believed to play a rôle in the interpretation of the results of this investigation. The majority of the rural-Mexican schools visited were housed in rather dilapidated one-room frame buildings—a discarded church or country store being occupied in many instances—so situated that in rainy weather the condition of the roads

made them inaccessible. Other conditions also detrimental to pedagogical advancement have been suggested from time to time in our discussions. We refer to such factors as the short school term—a three-months session being not uncommon—and the frequent absence from school to pick cotton, spinach, or engage in other farm labors. Indeed, after the first few days of this investigation the writers were no longer discouraged if they found, after traveling two hours or more, only as many as ten or twelve rural Mexicans in a school of supposedly considerable size. As mentioned in the various interpretations of our findings, other of our subject groups also contend with certain of these handicaps; but the situation for the rural Mexican is extreme in degree.

Inequality of environmental opportunities might again be offered for an interpretation of the diverse way in which the age and grade standards influence the variability of the school-experience records of our subject groups. But at this point it is only fair for us to reiterate, as another possibility, the interpretation advanced by the staunch upholders of heredity—namely, that these phenomena are merely reflections of the condition we are trying to investigate, mental ability.

V. DESCRIPTION OF THE TESTS

The tests employed in our investigation may be compared, among other ways, on the basis of the extent to which they involve verbal language. The Myers Pantomime Intelligence test is a distinctly non-verbal test and, hence, is well adapted for use among foreign groups. Not only is it a pictorial test, involving neither writing nor reading, but the directions are given very largely by means of non-vocal gestures, and the children are provided the opportunity of practicing on from three to six examples of each general problem type before essaying the sub-tests proper. Each one of the practice examples is checked carefully by the experimenter, and the erring child is redirected as well as informed of his error. The very limited number of oral commands which seemed to be necessary to effect uniformity in the general reaction of the pupils—commands such as "Stop," "Go," "Whole page," etc.—were given in both English and Spanish to the younger Mexican groups.

The Pantomime test consists of four pictorial sub-tests—a picture-completion test, a symbol-series-completion test, a similar-relations, and a dissimilar-relations test.

While the Pantomime test reduces to a minimum the language handicap of the foreign groups, it is not to be assumed that the test permits all of our subjects to operate under equally favorable conditions. It is questionable, for instance, whether our groups have had equal opportunity to familiarize themselves with many of the concepts included in its content. Then, too, those foreign children who in the practice test do not understand what is desired are not easily set aright. Although an interpreter was used in such cases, the very fact of this attention tended to confuse or embarrass the pupil. Lastly, the foreign groups are likely to be handicapped because of certain habits or attitudes which they carry over from a language situation involving English to a non-verbal, though language, situation. The Mexican who has built up the habit of pondering over commands given in English before

proceeding to the execution of them may react in the same way to an American's gesture commands and, hence, attack the test with little confidence or despatch. A hesitating manner, whether for this or other reasons, was very evident, especially among the rural and less advanced city Mexican groups.

The National Intelligence Test is particularly valuable as a contrast to the Pantomime test, because it presents numerous opportunities for the use of English. The directions are given verbally and are rather elaborate. Most of the sub-tests, furthermore, involve reading and writing, as well as general information which the school is a prominent agent in furnishing. A comparison, then, of the reactions of the subject groups to these two types of test should throw into relief the rôle of the language handicap of the foreigner in his performance on the former. Some of our groups, too, we might expect to be at a disadvantage, not only because of a deficiency in their experience with the English language, but also, as we have suggested in the case of the Pantomime test, because of a lack of opportunity to accumulate the experience necessary to a successful adaptation to the more general conceptual or informational content of the test.

The National is composed of five sub-tests—namely, an arithmetical, a best-answers, a sentence-completion, a synonym-antonym, and a digit-symbol-substitution test.

The Detroit and Pintner-Cunningham tests resemble one another and are intermediate to the Pantomime and National tests, as far as linguistic involvement is concerned. The commands are given verbally. These, however, were translated into Spanish for the Mexican groups. A practice example is also usually employed, but this is limited to one, in contrast to the rather extended number given in the Pantomime test.

The sub-tests of the Detroit are pictorial and include an information test, a form-, as well as size-discrimination test, two directions tests, an absurdity test, a symbol-series-completion test, and a copy test.

The Pintner-Cunningham test includes seven sub-tests—a general-information, an esthetic-discrimination, a picture-part, an associated-objects, a picture-completion, a dot-drawing, and a size-discrimination test.

VI. METHODS OF PRESENTING THE DATA

Our data will be presented in the form of: (1) age and grade standards for the various groups (see Tables XVII to XX, XXII to XXV, and Figures 6 to 11); (2) absolute- and relative-frequency distributions of the scores of our subject populations (see Tables IX to XVI and Figures 2 to 5); and (3) the percentage of each group exceeding the median score of each of the others (see Tables XXI and XXVI).

The frequency distributions indicate in a gross and unanalytical fashion the general trends of our results. (See Tables IX to XVI and Figures 2 to 5.) They show rather clearly the relative efficiency of the groups as wholes, the relative amounts of overlapping in the performance of the various peoples, and the total range of the reactions. They afford in no way, however, even a statistical control of innate or opportunity factors.

No description of the frequency surfaces will be attempted, since our aim in including them is merely to give the reader a bird's-eye view of the material before he is plunged into the details of our analysis.

The age norm (see Tables XVII to XX), in contrast to the non-analytical frequency surface, is a device for controlling statistically the time phase of that tremendously complex factor which we might term "opportunity for experience." It does not control perfectly, as has so often been assumed, even the factor of physical maturity, for it has been rather conclusively demonstrated that nutrition or race, for instance, as well as age, influences maturity. Both of these factors are conspicuous variables in our subject groups. Our age groups, furthermore, as was demonstrated in the previous chapter, differ widely in their school advantages. Since, lastly, certain economic and social forces, such as the school-attendance tradition, that vary with the age of the child, may affect the various racial, national, and economic groups differently, we are not justified in assuming that our age samples are entirely comparable, nor equally representative of

TABLE IX
FREQUENCY DISTRIBUTION OF THE PANTOMIME SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | | | | | Total |
|---------------|-------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| | 0-4.9 | 5-9.9 | 10-14.9 | 15-19.9 | 20-24.9 | 25-29.9 | 30-34.9 | 35-39.9 | 40-44.9 | 45-49.9 | 50-54.9 | 55-59.9 | |
| CW..... | 7 | 26 | 48 | 33 | 60 | 119 | 110 | 92 | 62 | 25 | 9 | 3 | 594 |
| CM..... | 21 | 30 | 59 | 73 | 93 | 131 | 113 | 59 | 32 | 17 | 1 | .... | 629 |
| CN..... | 42 | 65 | 87 | 91 | 96 | 113 | 73 | 31 | 8 | 4 | 3 | .... | 613 |
| RW..... | 11 | 63 | 96 | 124 | 112 | 81 | 72 | 35 | 19 | 4 | .... | .... | 617 |
| RM..... | 128 | 263 | 222 | 134 | 70 | 32 | 11 | 3 | .... | .... | .... | .... | 863 |

TABLE X
RELATIVE FREQUENCY (PER CENT) OF THE PANTOMIME SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | | | | | | Total |
|---------------|-------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| | 0-4.9 | 5-9.9 | 10-14.9 | 15-19.9 | 20-24.9 | 25-29.9 | 30-34.9 | 35-39.9 | 40-44.9 | 45-49.9 | 50-54.9 | 55-59.9 | 60-64.9 | |
| CW..... | 1.4 | 4.4 | 8.0 | 5.5 | 10.1 | 20.0 | 18.5 | 15.5 | 10.4 | 4.2 | 1.5 | 0.5 | .... | 100 |
| CM..... | 3.3 | 4.8 | 9.4 | 11.6 | 14.8 | 20.8 | 18.0 | 9.4 | 5.1 | 2.7 | .1 | .... | .... | 100 |
| CN..... | 6.8 | 10.6 | 14.2 | 14.8 | 15.7 | 18.4 | 11.9 | 5.2 | 1.3 | .6 | .5 | .... | .... | 100 |
| RW..... | 1.8 | 10.2 | 15.6 | 20.1 | 18.3 | 13.0 | 11.7 | 5.7 | 3.0 | .6 | .... | .... | .... | 100 |
| RM..... | 14.8 | 30.5 | 25.7 | 15.5 | 8.2 | 3.7 | 1.2 | .4 | .... | .... | .... | .... | .... | 100 |

TABLE XI
FREQUENCY DISTRIBUTION OF THE NATIONAL SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | Total |
|---------------|--------|---------|---------|---------|---------|-----------|-----------|-----------|-------|
| | 0-19.9 | 20-39.9 | 40-59.9 | 60-79.9 | 80-99.9 | 100-119.9 | 120-139.9 | 140-159.9 | |
| CW..... | 4 | 22 | 54 | 63 | 63 | 51 | 30 | 7 | 294 |
| CM..... | 17 | 74 | 75 | 56 | 34 | 13 | 1 | ... | 270 |
| CN..... | 7 | 55 | 97 | 66 | 20 | ... | 1 | ... | 246 |
| RW..... | 14 | 41 | 74 | 66 | 67 | 44 | 16 | 5 | 327 |
| RM..... | 43 | 65 | 53 | 11 | 8 | 1 | ... | ... | 180 |

TABLE XII
RELATIVE FREQUENCY (PER CENT) OF THE NATIONAL SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | Total |
|---------------|--------|---------|---------|---------|---------|-----------|-----------|-----------|-------|
| | 0-19.9 | 20-39.9 | 40-59.9 | 60-79.9 | 80-99.9 | 100-119.9 | 120-139.9 | 140-159.9 | |
| CW..... | 1.4 | 7.5 | 18.4 | 21.4 | 21.4 | 17.4 | 10.2 | 2.3 | 100 |
| CM..... | 6.3 | 27.4 | 27.8 | 20.7 | 12.6 | 4.8 | .4 | .... | 100 |
| CN..... | 2.8 | 22.3 | 39.4 | 26.8 | 8.3 | .... | .4 | .... | 100 |
| RW..... | 4.3 | 12.5 | 22.6 | 20.2 | 20.4 | 13.6 | 4.9 | 1.5 | 100 |
| RM..... | 23.8 | 36.0 | 29.4 | 6.10 | 4.3 | .5 | .... | .... | 100 |

TABLE XIII
FREQUENCY DISTRIBUTION OF THE DETROIT SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | | | | Total |
|---------------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| | 5-9.9 | 10-14.9 | 15-19.9 | 20-24.9 | 25-29.9 | 30-34.9 | 35-39.9 | 40-44.9 | 45-49.9 | 50-54.9 | 55-59.9 | |
| CW..... | | | | 1 | 3 | 8 | 16 | 38 | 12 | .... | .... | 78 |
| CM..... | | 2 | 4 | 8 | 13 | 16 | 25 | 25 | 9 | 2 | .... | 104 |
| CN..... | | | 5 | 5 | 15 | 25 | 37 | 36 | 9 | .... | .... | 132 |

TABLE XIV
RELATIVE FREQUENCY (PER CENT) OF THE DETROIT SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | | | | | Total |
|---------------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| | 5-9.9 | 10-14.9 | 15-19.9 | 20-24.9 | 25-29.9 | 30-34.9 | 35-39.9 | 40-44.9 | 45-49.9 | 50-54.9 | 55-59.9 | 60-64.9 | |
| CW..... | | | | 1.2 | 3.8 | 10.3 | 20.6 | 48.7 | 14.5 | .... | .... | .... | 100 |
| CM..... | | 1.8 | 3.8 | 7.5 | 12.3 | 15.4 | 24.4 | 24.4 | 8.6 | 1.8 | .... | .... | 100 |
| CN..... | | | 3.8 | 3.8 | 11.4 | 18.9 | 28.0 | 27.3 | 6.8 | .... | .... | .... | 100 |

TABLE XV
FREQUENCY DISTRIBUTION OF THE PINTNER-CUNNINGHAM SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | | | | Total |
|---------------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| | 5-9.9 | 10-14.9 | 15-19.9 | 20-24.9 | 25-29.9 | 30-34.9 | 35-39.9 | 40-44.9 | 45-49.9 | 50-54.9 | 55-59.9 | |
| CW..... | .... | .... | 3 | 3 | 11 | 10 | 26 | 31 | 29 | 11 | 2 | 126 |
| CM..... | .... | 3 | 5 | 3 | 12 | 15 | 17 | 23 | 15 | 6 | 1 | 100 |
| CN..... | 1 | .... | 1 | .... | 2 | 12 | 26 | 26 | 16 | 3 | .... | 87 |

TABLE XVI
RELATIVE FREQUENCY (PER CENT) OF THE PINTNER-CUNNINGHAM SCORES OF THE VARIOUS SUBJECT GROUPS

| Subject Group | Score | | | | | | | | | | | | Total |
|---------------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| | 5-9.9 | 10-14.9 | 15-19.9 | 20-24.9 | 25-29.9 | 30-34.9 | 35-39.9 | 40-44.9 | 45-49.9 | 50-54.9 | 55-59.9 | 60-64.9 | |
| CW..... | .... | .... | 2.4 | 2.4 | 8.7 | 8.0 | 20.6 | 24.6 | 23.0 | 8.7 | 1.6 | .... | 100 |
| CM..... | .... | 3.0 | 5.0 | 3.0 | 12.0 | 15.0 | 17.0 | 23.0 | 15.0 | 6.0 | 1.0 | .... | 100 |
| CN..... | 1.2 | .... | 1.2 | .... | 2.4 | 13.8 | 29.8 | 29.8 | 18.4 | 3.4 | .... | .... | 100 |

their respective populations. The samples with which we are dealing are school samples only.

The norms are stated in terms of the median, as well as the mean, in order that the influence of the extreme measures may be rendered apparent. Such a precaution seemed essential, since the number of subjects included in our age and grade groups is frequently small.

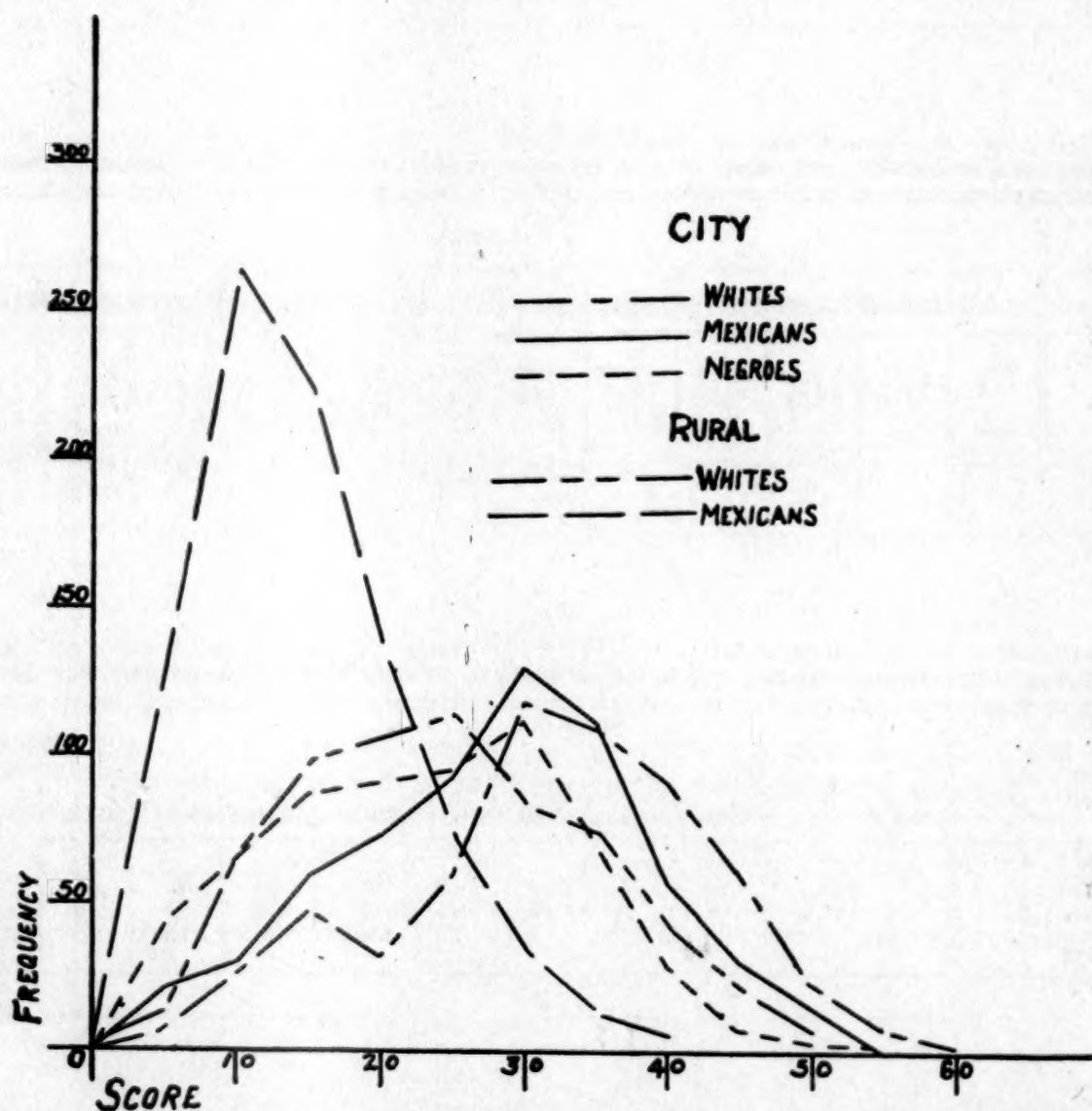


FIG. 2. Frequency Distribution of the Pantomime Scores of the Various Subject Groups.

Like the age norm, the grade norm (see Tables XXII to XXV), a device for supposedly equalizing at least school experience, is a very imperfect tool. Mere presence in the same grade in school does not mean equally efficient instruction, nor the enjoyment of equally satisfactory equipment. One needs but contrast the

splendidly furnished and administered schools of San Antonio with the little one-teacher rural school, in which the equipment seems to consist of a roof over the head and a pencil in the hand, in order to appreciate the pitiable inequality of some of our grade groups, as far as even school advantages are concerned. Furthermore, within the cities themselves the races are not always favored with entirely comparable school conditions. Lastly, the grade groups of our various subjects are undoubtedly not equally representative of their respective peoples, and the kind of representation varies in a diverse fashion in the different grades for each particular subject population.

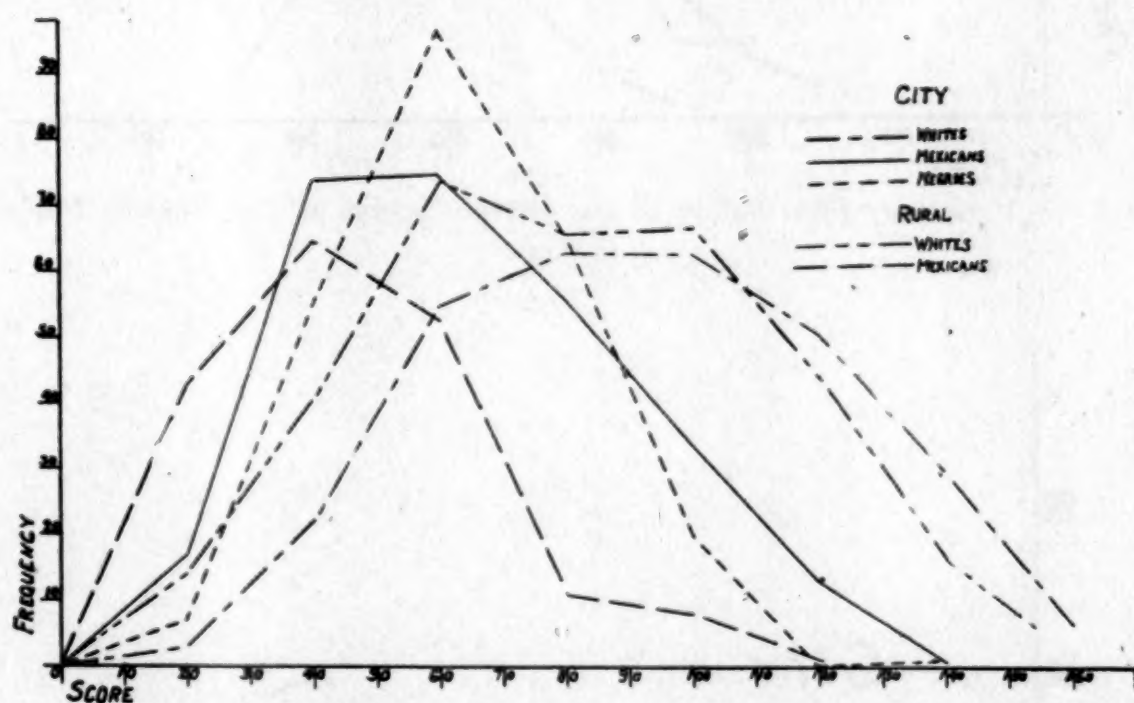


FIG. 3. Frequency Distribution of the National Scores of the Various Subject Groups.

A statement of the age and grade results in terms of a measure independent in general of the test weightings and the range of test scores is desirable, in order to facilitate comparisons such as that of the relative difficulty of our tests for the various subject populations, the relative degree of success with the different tests of the rural and city samples of given peoples, etc. Such a measure is the percentage of one group exceeding the median score of another.

The percentages were obtained by a method described earlier

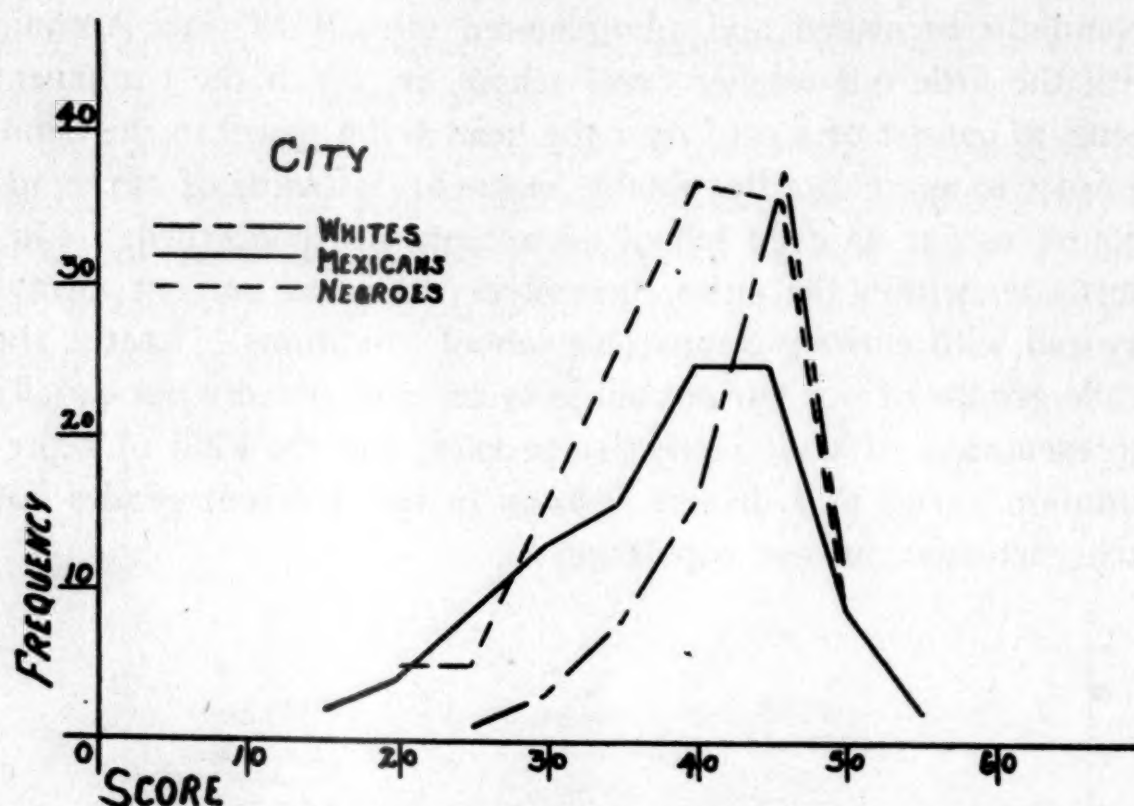


FIG. 4. Frequency Distribution of the Detroit Scores of the Various Subject Groups.

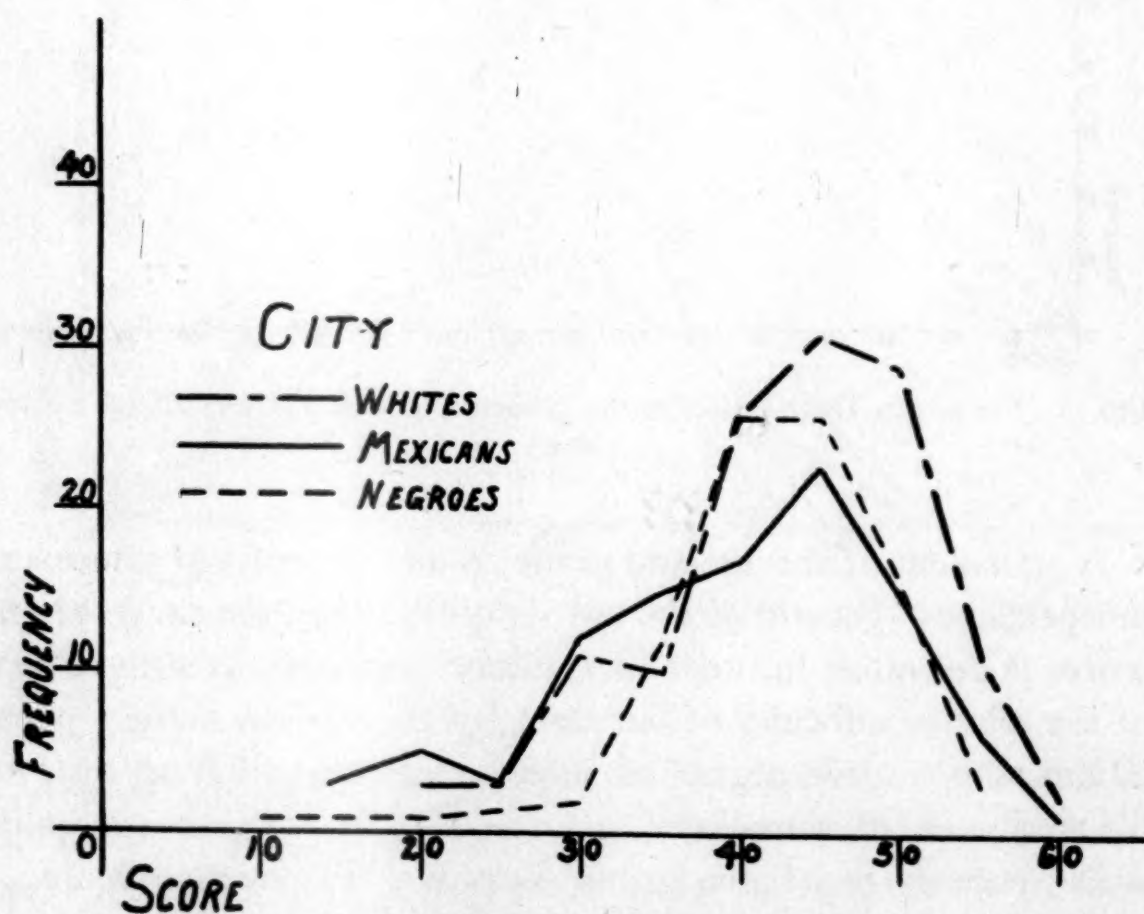


FIG. 5. Frequency Distribution of the Pintner-Cunningham Scores of the Various Subject Groups.

in the report. Since the number of measures included in any one distribution tends to be small, and the distributions, furthermore, are not always normal, the percentages are merely suggestive. Still, the repeated occurrence of certain relationships is probably a reliable index of the mode of operation of significant, rather than fortuitous, forces.

With the values and limitations of the various measures in mind, let us proceed to a consideration of our test results.

VII. PRESENTATION AND ANALYSIS OF THE TEST RESULTS

1. COMPARISON OF WHITES AND MEXICANS

Test Scores. For all tests (see Tables XVII to XXVI and Figures 6 to 11), at all ages, in all grades, and for both city and rural groups, the mean and median scores of the Whites are considerably higher than those of the Mexicans. That these differences are reliable is indicated not only by the consistency of the tendency shown, but also by the fact that, if we obtain the quotient of the difference between the various comparable age- and grade-group means or medians and the probable error of this difference, it ranges from .25 to 18.43 for the Pantomime test; for the National test, from .56 to 15.43; for the Pintner-Cunningham, from .74 to 3.82; and for the Detroit, from 1.31 to 10.03 (see Tables XVII to XX and XXII to XXV).

The reliability quotients of the age-group differences are all greater than 3, in the case of the National, Pantomime, and Detroit tests; and with one exception, this is true also for the Pintner-Cunningham. The same can be said of only about 50 per cent of the grade-norm differences.

Tables XXI and XXVI show, moreover, that 73 to 98 per cent of the Whites exceed the median of the equivalent Mexican age groups, and 53 to 80 per cent that of the grade groups. The Whites, then, unquestionably outrank the Mexicans in corresponding socio-economic divisions, and the performance of the two nationalities for a given grade tends to differ less than that for a given age.

Since the grade norm controls more successfully than does the age norm the factor of scholastic opportunity, this latter observation suggests that environmental factors play a not inconspicuous part in the determination of intelligence-test performance. The convincingness of the argument is marred somewhat, however, by the fact that the Mexican is favored in the grade-for-grade comparisons by his greater age and school experience.

A significant supplement to our major observation from which we have briefly digressed—that the Whites react much more successfully to the tests than do the corresponding city or rural Mexicans—is this: If the standard of the city Mexican is compared with that of the rural White—a comparison which equates probably more effectively than the intra-city and intra-rural ones the social opportunities of the groups—we find that the rural Whites excel consistently only on the National test. The performance on the Pantomime test of all of the city-Mexican grade groups is superior to that of the rural-White; and the same condition obtains for the age groups, with the exception of the seventh and eighth years. The differences just described do not have, however, the magnitude of those noted in the city-Mexican-city-White comparisons, nor the intra-rural comparisons of the two nationalities.

What are some of the possible interpretations of the slight, but consistent, superiority of the city-Mexican's reaction to the Pantomime test, as opposed to that of the rural White? To be sure, the former is favored in the grade comparisons by his greater age for a given grade, and, probably, through the operation of a sampling factor which makes itself felt significantly in the comparisons by ages as well. In other words, the older Mexican, doubtless, maintains his place in school more largely on the basis of his native ability than does the White, whose school-attendance tradition is of a higher standard, and who is not loaded with the economic burdens that retard the former. This latter hypothesis is supported by the fact that the absolute variability of the city-Mexican groups does not increase so uniformly with age as does that of the rural-White, and by the common observation that a larger percentage of Whites than of Mexicans of each age attend school. Accurate statistics on this latter point were not procurable, but the generalization is nevertheless unequivocal.

Of course, it is also possible that a very inferior class of Whites gravitates to the rural districts. Were this, however, the entire explanation of the relative standing of the city Mexicans and rural Whites, as far as the Pantomime test is concerned, then we

TABLE
AGE COMPARISONS OF THE VARIOUS

| Age | Mean ± P.E. Mean | | | Difference Between Means | | | | | |
|-----|------------------|-------------|--------------|--------------------------|------------|------------|------------|------------|------------|
| | W | M | N | P.E. Difference of Means | | | | | |
| | | | | C C W M | C C W N | C C M N | C R W W | C R M M | R R W M |
| 6 | C | 16.65 | 11.45 ± 1.49 | .. | .. | .. | .. | .. | .. |
| | R | | | .. | .. | .. | .. | .. | .. |
| 7 | C | 18.65 ± .62 | 10.30 ± .69 | 8.98 | 8.09 | 2.07 | 7.31 | 5.26 | 10.64 |
| | R | 12.58 ± .56 | 6.62 ± .11 | .. | .. | .. | .. | .. | .. |
| 8 | C | 25.75 ± .61 | 16.45 ± .87 | 8.77 | 6.04 | 2.09 | 10.14 | 8.77 | 10.75 |
| | R | 16.52 ± .68 | 8.03 ± .41 | .. | .. | .. | .. | .. | .. |
| 9 | C | 31.20 ± .51 | 21.45 ± .88 | 9.20 | 10.19 | 0.78 | 14.61 | 14.16 | 18.43 |
| | R | 20.24 ± .55 | 7.71 ± .41 | .. | .. | .. | .. | .. | .. |
| 10 | C | 33.85 ± .64 | 26.65 ± .57 | 8.47 | 11.63 | 4.02 | 11.05 | 25.28 | 14.78 |
| | R | 22.91 ± .76 | 11.23 ± .22 | .. | .. | .. | .. | .. | .. |
| 11 | C | 36.00 ± .74 | 28.74 ± .60 | 7.64 | 10.96 | 4.03 | 12.19 | 22.28 | 14.97 |
| | R | 23.93 ± .66 | 12.25 ± .42 | .. | .. | .. | .. | .. | .. |
| 12 | C | 36.85 ± .76 | 28.30 ± .57 | 9.00 | 11.34 | 3.89 | 10.07 | 22.39 | 15.63 |
| | R | 26.18 ± .74 | 13.52 ± .34 | .. | .. | .. | .. | .. | .. |
| 13 | C | 33.85 ± .98 | 29.30 ± .61 | 3.96 | 5.48 | 2.54 | 4.84 | 20.80 | 17.07 |
| | R | 28.04 ± .71 | 13.70 ± .45 | .. | .. | .. | .. | .. | .. |
| 14 | C | | 28.35 ± 1.06 | .. | .. | 1.62 | .. | 9.87 | 8.39 |
| | R | 24.95 ± .83 | 16.31 ± .61 | .. | .. | .. | .. | .. | .. |
| 15 | C | | 28.95 ± 1.22 | .. | .. | 3.86 | .. | 9.25 | .. |
| | R | | 15.17 ± .86 | .. | .. | .. | .. | .. | .. |

XVII

SUBJECT GROUPS—PANTOMIME TEST

| Median \pm P.E. Median | | | Difference Between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Fre- quency | | | | |
|--------------------------|------------------|------------------|--|--------|--------|--------|--------|--------|--------------------------|--------|-------|----------------|------|-----|----|----|
| W | M | N | C W | C M | C N | C W | R W | C M | R M | R W | W | M | N | W | M | N |
| 15.00 | ..... | 8.50 \pm 1.87 | .. | .. | .. | .. | .. | .. | .. | .. | 10.55 | .. | 9.65 | 6 | .. | 19 |
| 18.41 \pm .77 | 9.10 \pm .86 | 11.07 \pm .65 | 8.09 | 7.34 | 1.82 | 6.81 | 3.42 | 7.42 | 9.35 | 6.67 | 7.95 | 105 | 43 | 106 | | |
| 11.39 \pm .70 | 6.12 \pm .14 | ..... | .. | .. | .. | .. | .. | .. | 6.71 | 1.31 | .. | 66 | 61 | .. | | |
| 26.48 \pm .76 | 15.95 \pm 1.08 | 18.00 \pm .90 | 7.98 | 7.19 | 1.45 | 8.97 | 7.34 | 9.20 | 9.00 | 8.40 | 10.20 | 99 | 43 | 92 | | |
| 16.25 \pm .85 | 7.14 \pm .52 | ..... | .. | .. | .. | .. | .. | .. | 7.89 | 5.66 | .. | 61 | 86 | .. | | |
| 30.83 \pm .64 | 21.90 \pm 1.11 | 23.25 \pm .89 | 6.98 | 6.95 | 0.67 | 12.47 | 11.26 | 12.75 | 8.45 | 10.25 | 9.90 | 125 | 61 | 89 | | |
| 19.23 \pm .68 | 8.39 \pm .51 | ..... | .. | .. | .. | .. | .. | .. | 7.42 | 5.96 | .. | 84 | 97 | .. | | |
| 34.83 \pm .80 | 27.60 \pm .71 | 23.00 \pm .83 | 6.82 | 10.29 | 4.22 | 11.50 | 19.86 | 12.73 | 9.15 | 8.72 | 9.00 | 93 | 108 | 84 | | |
| 22.18 \pm .76 | 10.72 \pm .48 | ..... | .. | .. | .. | .. | .. | .. | 8.88 | 6.11 | .. | 98 | 118 | .. | | |
| 35.96 \pm .93 | 29.90 \pm .75 | 25.36 \pm .82 | 5.09 | 8.55 | 4.13 | 10.64 | 20.08 | 11.37 | 9.10 | 8.60 | 8.75 | 69 | 93 | 81 | | |
| 22.77 \pm .83 | 11.63 \pm .52 | ..... | .. | .. | .. | .. | .. | .. | 9.33 | 6.13 | .. | 91 | 99 | .. | | |
| 37.50 \pm .95 | 27.90 \pm .71 | 26.07 \pm .96 | 8.13 | 8.28 | 1.54 | 9.08 | 18.32 | 12.17 | 8.95 | 8.15 | 9.10 | 63 | 94 | 65 | | |
| 25.42 \pm .94 | 12.88 \pm .43 | ..... | .. | .. | .. | .. | .. | .. | 9.46 | 5.86 | .. | 72 | 133 | .. | | |
| 35.31 \pm 1.22 | 29.15 \pm .75 | 26.64 \pm 1.15 | 4.31 | 5.16 | 1.83 | 4.51 | 17.71 | 14.96 | 8.30 | 9.46 | 9.15 | 33 | 108 | 45 | | |
| 28.50 \pm .89 | 13.39 \pm .48 | ..... | .. | .. | .. | .. | .. | .. | 9.06 | 7.24 | .. | 74 | 118 | .. | | |
| ..... | 28.20 \pm 1.34 | 26.50 \pm 1.84 | .. | .. | 0.75 | .. | 8.83 | 7.82 | .. | 10.83 | 9.50 | .. | 47 | 19 | | |
| 24.69 \pm 1.04 | 14.60 \pm .76 | ..... | .. | .. | .. | .. | .. | .. | 8.94 | 8.46 | .. | 53 | 88 | .. | | |
| ..... | 30.00 \pm 1.52 | 22.50 \pm 1.87 | .. | .. | 3.11 | .. | 8.40 | .. | .. | 9.54 | 7.00 | .. | 28 | 10 | | |
| ..... | 14.38 \pm 1.08 | ..... | .. | .. | .. | .. | .. | .. | .. | 8.55 | .. | .. | 45 | .. | | |

TABLE
AGE COMPARISONS OF THE VARIOUS

| Age | | Mean \pm P.E. Mean | | | Difference Between Means P.E. Difference of Means | | | | | |
|-----|---|----------------------|------------------|------------------|--|-------|------|------|-------|-------|
| | | W | M | N | C C | | C C | | C R | |
| | | | | | W M | W N | M N | W W | M M | R R |
| 8 | C | 54.15 \pm 4.93 | ..... | 48.50 \pm 2.37 | .. | 1.18 | .. | .. | .. | .. |
| | R | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| 9 | C | 65.65 \pm 2.30 | 45.40 \pm 4.11 | 50.05 \pm 2.13 | 4.30 | 4.98 | 1.00 | 2.78 | .. | .. |
| | R | 56.16 \pm 2.53 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| 10 | C | 66.80 \pm 1.53 | 48.65 \pm 2.20 | 52.35 \pm 2.15 | 6.79 | 5.49 | 1.20 | 0.18 | .. | .. |
| | R | 66.29 \pm 2.29 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| 11 | C | 94.35 \pm 2.39 | 50.37 \pm 2.12 | 58.15 \pm 1.54 | 13.78 | 12.74 | 2.98 | 6.93 | 6.84 | 13.00 |
| | R | 71.13 \pm 2.35 | 29.78 \pm 2.15 | ..... | .. | .. | .. | .. | .. | .. |
| 12 | C | 102.75 \pm 2.47 | 47.05 \pm 2.75 | 55.20 \pm 2.25 | 15.09 | 14.23 | 2.29 | 5.36 | 3.89 | 11.23 |
| | R | 81.98 \pm 2.99 | 30.98 \pm 3.42 | ..... | .. | .. | .. | .. | .. | .. |
| 13 | C | 96.00 \pm 3.41 | 61.45 \pm 2.13 | 59.05 \pm 1.93 | 8.61 | 9.45 | 0.83 | 3.15 | 10.01 | 15.43 |
| | R | 82.24 \pm 2.59 | 33.30 \pm 1.84 | ..... | .. | .. | .. | .. | .. | .. |
| 14 | C | ..... | 63.35 \pm 3.39 | 57.15 \pm 3.03 | .. | .. | 1.36 | .. | 5.05 | 14.39 |
| | R | 101.22 \pm 3.44 | 43.19 \pm 2.11 | ..... | .. | .. | .. | .. | .. | .. |
| 15 | C | ..... | 65.85 \pm 3.44 | 33.75 | .. | .. | .. | .. | 4.74 | .. |
| | R | ..... | 42.72 \pm 3.45 | ..... | .. | .. | .. | .. | .. | .. |

XVIII
SUBJECT GROUPS—NATIONAL TEST

| Median ± P.E. Median | | | Difference Between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Fre- quency | | |
|----------------------|------------|------------|--|--------|--------|--------|--------|--------|--------------------------|--------|--------|----------------|-------|-------|
| W | M | N | C W | C M | C N | C W | C N | C M | R W | R M | R N | W | M | N |
| 52.50±6.18 | ..... | 49.16±2.97 | .. | | 0.48 | .. | | .. | .. | | | 28.30 | .. | 17.55 |
| 59.00±2.88 | 40.00±5.16 | 50.62±2.97 | 3.41 | 2.02 | 1.78 | 0.49 | .. | .. | .. | .. | .. | 25.45 | 21.15 | 20.70 |
| 56.88±3.17 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | 23.99 | .. | .. |
| 68.61±1.92 | 44.38±2.76 | 54.00±2.69 | 7.21 | 4.42 | 2.49 | 2.49 | .. | .. | .. | .. | .. | 19.10 | 22.39 | 19.60 |
| 60.00±2.87 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | 27.57 | .. | .. |
| 96.25±3.00 | 50.62±2.66 | 55.42±1.93 | 11.40 | 11.46 | 1.46 | 5.20 | 5.89 | 11.53 | 27.50 | 21.56 | 16.95 | 60 | 47 | 55 |
| 74.38±2.95 | 28.34±2.70 | ..... | .. | .. | .. | .. | .. | .. | 28.99 | 14.98 | .. | 69 | 22 | .. |
| 07.08±3.10 | 40.83±3.44 | 55.50±2.82 | 14.30 | 12.31 | 3.30 | 5.36 | 2.87 | 11.39 | 28.15 | 27.60 | 20.30 | 59 | 46 | 37 |
| 81.00±3.75 | 28.22±2.73 | ..... | .. | .. | .. | .. | .. | .. | 30.69 | 19.41 | .. | 48 | 23 | .. |
| 98.13±4.27 | 66.25±2.68 | 57.50±2.42 | 6.32 | 8.33 | 2.33 | 3.50 | 9.56 | 11.80 | 29.00 | 24.86 | 14.60 | 33 | 62 | 26 |
| 79.38±3.24 | 32.50±2.31 | ..... | .. | .. | .. | .. | .. | .. | 28.94 | 18.13 | .. | 57 | 44 | .. |
| ..... | 57.50±4.25 | 57.50±3.79 | .. | .. | 0.00 | .. | 3.25 | 12.50 | .. | 27.10 | 16.75 | .. | 29 | 14 |
| 104.38±4.31 | 41.25±2.65 | ..... | .. | .. | .. | .. | .. | .. | 33.45 | 22.37 | .. | 43 | 51 | .. |
| ..... | 70.00±4.31 | 30.00 | .. | .. | .. | .. | 3.99 | .. | .. | 25.00 | 14.75 | .. | 24 | 4 |
| ..... | 45.62±4.33 | ..... | .. | .. | .. | .. | .. | .. | .. | 24.55 | .. | .. | 23 | .. |

TABLE XIX
AGE COMPARISONS OF THE VARIOUS SUBJECT GROUPS—PINTNER-CUNNINGHAM TEST

| Age | Mean \pm P.E. Mean | | | Median \pm P. E. Median | | | Difference between Means P.E. Difference of Means | | | Difference between Medians P.E. Difference of Medians | | | Sigma of Distribution | | | Fre- quency | | | | |
|----------|----------------------|------------------|------------------|---------------------------|------------------|------------------|--|---------|---------|--|---------|---------|-----------------------|------|------|----------------|----|----|----|----|
| | W | M | N | W | M | N | C WM | C WN | C MN | C WM | C WN | C MN | W | M | N | W | M | N | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 6.....C | 35.00 | ..... | ..... | 35.00 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 4 | .. | .. |
| 7.....C | 34.80 \pm 0.96 | ..... | 43.15 | 36.25 \pm 1.20 | ..... | 43.33 | .. | .. | .. | .. | .. | .. | 8.40 | .. | 3.90 | 35 | .. | 8 | .. | .. |
| 8.....C | 42.00 \pm 0.68 | 26.80 | 37.50 \pm 0.86 | 42.31 \pm 0.85 | 27.50 | 37.50 \pm 1.07 | .. | 4.12 | .. | .. | 3.53 | .. | 6.50 | 7.28 | 6.95 | 42 | 7 | 30 | .. | .. |
| 9.....C | 44.15 \pm 0.79 | 37.80 \pm 1.47 | 39.65 \pm 0.95 | 45.21 \pm 0.99 | 40.94 \pm 1.85 | 38.57 \pm 1.19 | 3.82 | 3.65 | 1.06 | 2.04 | 4.31 | 1.08 | 6.70 | 9.00 | 5.25 | 33 | 17 | 14 | .. | .. |
| 10.....C | 44.70 | 38.95 \pm 1.17 | 40.45 \pm 1.59 | 45.83 | 39.50 \pm 1.47 | 42.50 \pm 1.99 | .. | .. | 0.76 | .. | .. | 1.21 | 8.20 | 9.70 | 9.70 | 9 | 31 | 17 | .. | .. |
| 11.....C | 42.50 | 38.60 \pm 1.31 | 41.95 | 42.50 | 40.00 \pm 1.64 | 41.88 | .. | .. | .. | .. | .. | .. | .. | 8.25 | 3.70 | 3 | 18 | 9 | .. | .. |
| 12.....C | ..... | 34.35 | 43.75 | ..... | 35.00 | 45.00 | .. | .. | .. | .. | .. | .. | .. | 1235 | 4.15 | .. | 8 | 4 | .. | .. |
| 13.....C | ..... | 41.10 \pm 0.87 | ..... | ..... | 40.00 \pm 1.09 | ..... | .. | .. | .. | .. | .. | .. | .. | 4.80 | .. | .. | 14 | .. | .. | .. |

TABLE XX
AGE COMPARISONS OF THE VARIOUS SUBJECT GROUPS—DETROIT TEST

| Age | Mean \pm P.E. Mean | | | Difference between Means P.E. Difference of Means | | | | | | Median \pm P.E. Median | | | Difference between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Frequency | | |
|----------|----------------------|------------------|------------------|--|-------|-------|-------|-------|-------|--------------------------|------------------|------------------|--|-------|-------|-------|-------|-------|-----------------------|-------|-------|-----------|-------|----|
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | W | M | N | C | C | C | C | C | C | W | M | N | C | C | C | C | C | C | W | M | N | W | M | N |
| | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N | W | M | N |
| 6.....C | ..... | ..... | 34.50 \pm 1.18 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 35.00 \pm 1.48 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 10 |
| 7.....C | 39.40 \pm .54 | 28.06 \pm 1.00 | 35.00 \pm 0.63 | 10.03 | 5.36 | 5.93 | ..... | ..... | ..... | 40.60 \pm 0.68 | 28.20 \pm 1.26 | 36.32 \pm .80 | 8.73 | 4.11 | 5.48 | ..... | ..... | ..... | 5.50 | 7.75 | 7.65 | 47 | 27 | 66 |
| 8.....C | 40.75 \pm 0.68 | 36.05 \pm 0.86 | 36.85 \pm 0.92 | 4.31 | 3.42 | 0.64 | ..... | ..... | ..... | 41.73 \pm 0.85 | 37.15 \pm 1.08 | 38.13 \pm 1.15 | 3.34 | 2.53 | 0.62 | ..... | ..... | ..... | 4.80 | 6.23 | 6.55 | 23 | 24 | 23 |
| 9.....C | 45.00 | 35.75 \pm 1.24 | 38.95 \pm 0.90 | ..... | ..... | 2.10 | ..... | ..... | ..... | 45.00 | 37.50 \pm 1.55 | 38.75 \pm 1.13 | ..... | ..... | 0.65 | ..... | ..... | ..... | 2.50 | 8.81 | 5.50 | 8 | 23 | 17 |
| 10.....C | ..... | 39.30 \pm 0.99 | 37.90 \pm 1.37 | ..... | ..... | 0.83 | ..... | ..... | ..... | ..... | 39.38 \pm 1.24 | 38.75 \pm 1.72 | ..... | ..... | 0.29 | ..... | ..... | ..... | 4.90 | 9.95 | ..... | 11 | 12 | |
| 11.....C | ..... | 43.12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 45.00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 8.46 | ..... | ..... | 8 | |
| 12.....C | ..... | 41.05 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 40.83 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3.50 | ..... | ..... | 7 | |

should be justified in expecting the Mexican, whatever his age, to excel. This condition does not obtain, for the youngest rural Whites outrank the city Mexicans. Still we may argue, in this latter case, that the linguistic deficiency of the young, untutored, city Mexican may so paralyze his initiative or self-confidence that, in spite of his general ability, he can not surpass the rural Whites on a relatively non-verbal test.

TABLE XXI
AGE COMPARISONS OF THE VARIOUS SUBJECT GROUPS ON THE BASIS OF THE PER CENT OF ONE GROUP EXCEEDING THE MEDIAN TEST SCORE OF ANOTHER

| Comparison | Test | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | years | years | years | years | years | years | years | years | years |
| Per cent of CW exceeding Md. of CM..... | Pantomime..... | 83 | 88 | 84 | 78 | 75 | 85 | 77 | .. | .. |
| | National..... | .. | .. | .. | 77 | 90 | 85 | 88 | 83 | .. |
| | Pintner-Cunningham.. | .. | .. | 73 | .. | .. | .. | .. | .. | .. |
| | Detroit..... | 98 | 83 | .. | .. | .. | .. | .. | .. | .. |
| Per cent of RW exceeding Md. of RM..... | Pantomime..... | 78 | 87 | 93 | 90 | 88 | 91 | 95 | 87 | .. |
| | National..... | .. | .. | .. | .. | 94 | 96 | 94 | 97 | .. |
| Per cent of CW exceeding Md. of RW..... | Pantomime..... | 77 | 87 | 91 | 92 | 93 | 91 | 79 | .. | .. |
| | National..... | .. | .. | 53 | 67 | 69 | 68 | 71 | .. | .. |
| Per cent of CM exceeding Md. of RM..... | Pantomime..... | 67 | 85 | 91 | 97 | 98 | 97 | 95 | 90 | 95 |
| | National..... | .. | .. | .. | .. | 85 | 67 | 91 | 72 | 84 |
| Per cent of RW exceeding Md. of CM..... | Pantomime..... | 63 | 52 | 36 | 27 | 23 | 40 | 47 | 35 | .. |
| | National..... | .. | .. | 75 | 71 | 79 | 90 | 67 | 96 | .. |
| Per cent of CW exceeding Md. of CN..... | Pantomime..... | 78 | 83 | 81 | 90 | 88 | 90 | 85 | .. | .. |
| | National..... | .. | 54 | 63 | 78 | 82 | 82 | 88 | .. | .. |
| | Pintner-Cunningham.. | .. | 77 | 85 | .. | .. | .. | .. | .. | .. |
| | Detroit..... | 78 | 77 | .. | .. | .. | .. | .. | .. | .. |
| Per cent of RW exceeding Md. of CN..... | Pantomime..... | 52 | 41 | 29 | 46 | 39 | 58 | 58 | 42 | .. |
| | National..... | .. | .. | 60 | 58 | 84 | 80 | 77 | 96 | .. |
| Per cent of CM exceeding Md. of CN..... | Pantomime..... | 38 | 40 | 45 | 70 | 70 | 59 | 60 | 56 | .. |
| | National..... | .. | .. | 31 | 33 | 41 | 30 | 64 | 50 | .. |
| | Pintner-Cunningham.. | .. | .. | 60 | 38 | .. | .. | .. | .. | .. |
| | Detroit..... | 15 | 44 | 45 | .. | .. | .. | .. | .. | .. |

If unfamiliarity with English presumably functions thus materially in the response to the Pantomime test, how much more profound should we expect to be its effects on the other tests. Do our data justify our expectations? The handicap on the National test seems to manifest itself in several interesting relationships. The reversal of the position of first rank among the city Mexicans and rural Whites in the Pantomime and National tests is a significant one of these. Then, too, in the intra-urban and intra-rural comparisons, among both age and grade groups,

there is consistently more overlapping of the Pantomime score distributions of the two nationalities than of the National. Especially does this latter fact become significant when we note, in the case of the city Negro, who suffers no such pronounced linguistic deficiency as the Mexican, that the National test is not, relative to the city-White standard, more difficult for him than is the Pantomime. It seems reasonable to suggest in the light of these facts that the National test capitalizes the foreigners' disadvantages and, hence, is none too desirable as a tool for measuring the relative intelligence of races.

It is worthy of note at this point, furthermore, since we are facing the problem of the influence of linguistic factors upon test performance, that a larger percentage of city Whites exceeds the median of the city Mexicans in the case of the Detroit test than in the case of the Pantomime. The reverse obtains for the Pintner-Cunningham and Pantomime. The tests ranked, then, from highest to lowest in order of the degree to which they differentiate the two nationalities are the Detroit, National, Pantomime, and Pintner-Cunningham. Since, however, the percentages shown in Tables XXI and XXVI indicate only roughly the relative difficulties presented by our tests to the Mexican, and, moreover, since the Detroit and Pintner-Cunningham were given to only one grade, or a relatively few ages, we may with justice question the ranking of these one-grade tests. A rather serious consideration, however, of the various inter-test relationships will probably cast some light upon the problem of the forces active in the production of the one-grade test results.

The linguistic demands of the Detroit test may account, in part, for the fact that a greater percentage of first-grade Whites score higher than the median of the Mexicans in this test than in the Pantomime. The operation of the handicap is not so apparent in the age groups, probably because of the counterbalancing effect of a sampling factor; for let it be remembered that the Pantomime test was given to all of the pupils in the first five or six grades, whereas the personnel of the population submitting to the Detroit test was first-graders. It is not only possible but also probable, then, that merely the duller, less healthy eight-year-old

TABLE
GRADE COMPARISONS OF THE VARIOUS

| Grade | | Mean \pm P.E. Mean | | | Difference Between Means P.E. Difference of Means | | | | | |
|--------------------|---|----------------------|------------------|------------------|--|-------|------|-------|-------|------|
| | | W | M | N | C C | | C C | | C R | |
| | | | | | W M | W N | M N | W W | M M | R R |
| Low First..... | C | 12.85 \pm .62 | 10.00 \pm .65 | 8.50 \pm .59 | 3.20 | 6.04 | 1.97 | .. | .. | .. |
| High First..... | C | 20.15 \pm .79 | 18.65 \pm .66 | 12.30 \pm .53 | 1.47 | 9.69 | 7.65 | .. | .. | .. |
| Total First..... | C | 16.45 \pm .55 | 14.50 \pm .51 | 11.05 \pm .42 | 2.63 | 7.94 | 5.39 | 7.13 | 10.52 | 6.09 |
| Total First..... | R | 11.60 \pm .42 | 8.92 \pm .18 | ..... | .. | .. | .. | .. | .. | .. |
| Low Second..... | C | 22.50 \pm .91 | 23.20 \pm .89 | 14.00 \pm .59 | 0.55 | 7.94 | 8.67 | .. | .. | .. |
| High Second..... | C | 27.80 \pm .70 | 23.65 \pm .62 | 20.50 \pm .84 | 4.77 | 6.69 | 3.05 | .. | .. | .. |
| Total Second..... | C | 29.15 \pm .58 | 23.45 \pm .52 | 17.25 \pm .56 | 7.40 | 14.87 | 8.15 | 16.21 | 17.21 | 6.39 |
| Total Second..... | R | 16.83 \pm .50 | 13.12 \pm .31 | ..... | .. | .. | .. | .. | .. | .. |
| Low Third..... | C | 30.55 \pm .71 | 25.05 \pm .63 | 24.50 \pm .66 | 5.85 | 7.11 | 0.61 | .. | .. | .. |
| High Third..... | C | 28.85 \pm .69 | 27.10 \pm .63 | 22.95 \pm .64 | 1.90 | 6.34 | 4.71 | .. | .. | .. |
| Total Third..... | C | 29.75 \pm .50 | 25.90 \pm .46 | 23.70 \pm .46 | 5.74 | 9.02 | 3.43 | 13.33 | 14.70 | 7.15 |
| Total Third..... | R | 20.15 \pm .53 | 16.93 \pm .42 | ..... | .. | .. | .. | .. | .. | .. |
| Low Fourth..... | C | 33.05 \pm .70 | 30.65 \pm .64 | 25.50 \pm .61 | 2.55 | 8.20 | 5.91 | .. | .. | .. |
| High Fourth..... | C | 36.35 \pm .55 | 33.95 \pm .61 | 27.55 \pm .60 | 2.96 | 10.86 | 7.52 | .. | .. | .. |
| Total Fourth..... | C | 34.85 \pm .45 | 32.25 \pm .44 | 26.55 \pm .43 | 4.19 | 13.60 | 9.50 | 16.56 | 18.14 | 6.61 |
| Total Fourth..... | R | 23.75 \pm .51 | 18.46 \pm .63 | ..... | .. | .. | .. | .. | .. | .. |
| Low Fifth..... | C | 33.75 \pm 1.12 | 29.20 \pm .71 | 28.40 \pm 1.05 | 3.44 | 3.49 | 0.63 | .. | .. | .. |
| High Fifth..... | C | 32.90 \pm .99 | 32.50 \pm 1.22 | 28.20 \pm 1.59 | 0.25 | 2.51 | 2.15 | .. | .. | .. |
| Total Fifth..... | C | 33.30 \pm .74 | 30.00 \pm .63 | 28.30 \pm 1.00 | 3.43 | 4.03 | 1.45 | 6.78 | 9.86 | 7.40 |
| Total Fifth..... | R | 26.99 \pm .58 | 18.85 \pm .95 | ..... | .. | .. | .. | .. | .. | .. |
| Low Sixth..... | C | 38.45 \pm .90 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| High Sixth..... | C | 39.85 \pm .95 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Sixth..... | C | 39.00 \pm .66 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Sixth..... | R | 31.12 \pm .69 | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Low Seventh..... | C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| High Seventh..... | C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Seventh..... | C | ..... | ..... | ..... | .. | .. | .. | .. | .. | .. |
| Total Seventh..... | R | 27.51 \pm .96 | ..... | ..... | .. | .. | .. | .. | .. | .. |

XXII

SUBJECT GROUPS—PANTOMIME TEST

| Median \pm P.E. Median | | | Difference Between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Fre- quency | | | | |
|--------------------------|------------------|------------------|--|--------|--------|--------|--------|--------|--------------------------|--------|------|----------------|------|-----|-----|-----|
| W | M | N | C W | C M | C N | C W | R W | C M | R M | R W | W | M | N | W | M | N |
| 12.19 \pm .77 | 9.38 \pm .81 | 7.50 \pm .74 | 2.53 | 4.42 | 1.72 | .. | .. | .. | .. | .. | 6.80 | 7.70 | 5.81 | 55 | 64 | 44 |
| 21.41 \pm .99 | 17.86 \pm .82 | 11.25 \pm .66 | 2.77 | 8.61 | 6.35 | .. | .. | .. | .. | .. | 8.50 | 7.90 | 7.45 | 53 | 66 | 91 |
| 14.66 \pm .69 | 14.00 \pm .64 | 9.80 \pm .52 | 0.70 | 5.65 | 5.18 | 4.37 | 8.84 | 4.89 | .. | .. | 8.50 | 8.60 | 7.20 | 108 | 130 | 135 |
| 10.90 \pm .53 | 8.16 \pm .21 | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 6.06 | 5.35 | .. | 94 | 473 | .. |
| 24.00 \pm 1.14 | 23.05 \pm 1.12 | 13.20 \pm .74 | 0.59 | 7.00 | 4.96 | .. | .. | .. | .. | .. | 8.10 | 9.25 | 6.56 | 36 | 49 | 57 |
| 28.33 \pm .88 | 23.83 \pm .78 | 20.32 \pm 1.05 | 3.84 | 5.89 | 2.70 | .. | .. | .. | .. | .. | 8.20 | 7.55 | 9.74 | 62 | 67 | 57 |
| 26.96 \pm .73 | 23.45 \pm .65 | 15.71 \pm .71 | 3.61 | 11.13 | 8.14 | 11.71 | 14.12 | 10.24 | .. | .. | 8.55 | 8.30 | 8.92 | 98 | 116 | 114 |
| 15.83 \pm .63 | 12.86 \pm .39 | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 7.00 | 6.08 | .. | 89 | 172 | .. |
| 29.72 \pm .89 | 26.11 \pm .79 | 25.63 \pm .83 | 3.05 | 3.38 | 0.42 | .. | .. | .. | .. | .. | 8.30 | 8.35 | 8.14 | 62 | 79 | 69 |
| 29.71 \pm .86 | 27.00 \pm .79 | 24.10 \pm .80 | 2.18 | 4.79 | 2.58 | .. | .. | .. | .. | .. | 7.60 | 7.85 | 8.14 | 56 | 70 | 74 |
| 29.71 \pm .62 | 26.55 \pm .57 | 25.01 \pm .58 | 3.80 | 5.59 | 1.92 | 11.39 | 13.71 | 4.14 | .. | .. | 8.00 | 8.25 | 8.18 | 118 | 149 | 143 |
| 19.57 \pm .65 | 16.13 \pm .52 | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 8.05 | 6.58 | .. | 107 | 114 | .. |
| 33.83 \pm .88 | 30.55 \pm .81 | 25.63 \pm .77 | 2.75 | 7.06 | 4.43 | .. | .. | .. | .. | .. | 8.30 | 8.00 | 8.67 | 64 | 70 | 92 |
| 36.03 \pm .69 | 32.92 \pm .76 | 27.10 \pm .75 | 3.07 | 8.84 | 4.54 | .. | .. | .. | .. | .. | 7.20 | 7.25 | 9.09 | 79 | 65 | 104 |
| 35.00 \pm .56 | 31.73 \pm .56 | 26.35 \pm .54 | 4.19 | 11.24 | 6.98 | 14.96 | 13.90 | 4.09 | .. | .. | 7.90 | 7.65 | 8.93 | 143 | 135 | 196 |
| 22.43 \pm .64 | 18.34 \pm .79 | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 8.51 | 7.72 | .. | 128 | 78 | .. |
| 33.35 \pm 1.40 | 28.90 \pm .90 | 28.50 \pm 1.31 | 2.68 | 2.54 | 0.25 | .. | .. | .. | .. | .. | 7.40 | 9.25 | 5.15 | 20 | 76 | 11 |
| 33.25 \pm 1.23 | 32.50 \pm 1.53 | 30.00 \pm 2.00 | 0.38 | 1.38 | 0.99 | .. | .. | .. | .. | .. | 7.35 | 8.70 | 8.83 | 25 | 23 | 14 |
| 33.28 \pm .93 | 29.45 \pm .79 | 28.75 \pm 1.26 | 3.16 | 2.90 | 0.47 | 5.06 | 7.23 | 5.88 | .. | .. | 7.35 | 9.25 | 7.44 | 45 | 99 | 25 |
| 27.35 \pm .73 | 19.17 \pm 1.19 | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 8.06 | 7.15 | .. | 87 | 26 | .. |
| 39.50 \pm 1.13 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 9.25 | .. | .. | 48 | .. | .. |
| 40.00 \pm 1.20 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 8.25 | .. | .. | 34 | .. | .. |
| 39.76 \pm .83 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 8.90 | .. | .. | 82 | .. | .. |
| 28.66 \pm .86 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 8.56 | .. | .. | 71 | .. | .. |
| 27.05 \pm 1.20 | ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | 9.07 | .. | .. | 41 | .. | .. |

TABLE
 GRADE COMPARISONS OF THE VARIOUS

| Grade | Mean \pm P.E. Mean | | | Difference Between Means P.E. Difference of Means | | | | | |
|---------------------|----------------------|------------------|------------------|--|--------|--------|--------|--------|--------|
| | W | M | N | C W | C M | C N | C R | C M | R R |
| Low Third.....C | 35.80 \pm 1.51 | 29.70 \pm 1.45 | | .. | .. | 2.91 | .. | .. | .. |
| High Third.....C | 42.75 \pm 1.49 | 37.43 \pm 1.31 | 41.25 \pm 1.46 | 2.68 | 0.72 | 1.95 | .. | .. | .. |
| Total Third.....C | 42.25 \pm 1.44 | 36.80 \pm 1.00 | 38.50 \pm 1.23 | 3.11 | 1.98 | 1.07 | 0.23 | 6.30 | 7.59 |
| Total Third.....R | 41.75 \pm 1.54 | 27.40 \pm 1.11 | | .. | .. | .. | .. | .. | .. |
| Low Fourth.....C | 60.40 \pm 1.62 | 39.00 \pm 1.59 | 52.35 \pm 1.12 | 9.46 | 4.10 | 6.88 | .. | .. | .. |
| High Fourth.....C | 79.95 \pm 1.45 | 64.35 \pm 1.54 | 62.62 \pm .95 | 7.39 | 10.01 | 0.83 | .. | .. | .. |
| Total Fourth.....C | 73.20 \pm 1.27 | 51.85 \pm 1.37 | 58.60 \pm .84 | 11.47 | 9.66 | 4.21 | 6.24 | 4.63 | 9.06 |
| Total Fourth.....R | 61.64 \pm 1.36 | 41.56 \pm 1.75 | | .. | .. | .. | .. | .. | .. |
| Low Fifth.....C | 82.75 \pm 3.56 | 80.55 \pm 1.52 | 64.35 | 0.56 | .. | .. | .. | .. | .. |
| High Fifth.....C | 92.70 \pm 2.31 | | 82.50 \pm 2.12 | .. | 3.25 | .. | .. | .. | .. |
| Total Fifth.....C | 88.90 \pm 2.18 | | 75.40 \pm 2.33 | .. | 4.24 | .. | 1.43 | .. | 8.32 |
| Total Fifth.....R | 84.83 \pm 1.81 | 53.10 \pm 3.31 | | .. | .. | .. | .. | .. | .. |
| Low Sixth.....C | 108.55 \pm 1.93 | | | .. | .. | .. | .. | .. | .. |
| High Sixth.....C | 120.00 \pm 2.22 | | | .. | .. | .. | .. | .. | .. |
| Total Sixth.....C | 113.30 \pm 1.52 | | | .. | .. | .. | 5.84 | .. | .. |
| Total Sixth.....R | 98.58 \pm 2.02 | | | .. | .. | .. | .. | .. | .. |
| Low Seventh.....C | | | | .. | .. | .. | .. | .. | .. |
| High Seventh.....C | | | | .. | .. | .. | .. | .. | .. |
| Total Seventh.....C | | | | .. | .. | .. | .. | .. | .. |
| Total Seventh.....R | 114.46 \pm 2.76 | | | .. | .. | .. | .. | .. | .. |

TABLE XXIII
SUBJECT GROUPS—NATIONAL TEST

| | | Median \pm P.E. Median | | | Difference Between Medians P.E. Difference of Medians | | | | | | Sigma of Distribution | | | Fre- quency | | |
|------|---|--------------------------|------------------|------------------|--|-------|------|------|------|------|--------------------------|-------|-------|----------------|-------|-------|
| R | R | W | M | N | C | C | C | C | C | R | W | M | N | W | M | N |
| W | M | | | | W | M | N | W | N | W | W | M | M | W | M | N |
| | | | | | | | | | | | | | | | | |
| .. | | 36.25 \pm 1.89 | 30.00 \pm 1.82 | | .. | .. | 2.38 | .. | .. | .. | .. | 13.80 | 9.15 | .. | 38 | 18 |
| .. | | 44.17 \pm 1.87 | 35.56 \pm 1.64 | 39.70 \pm 1.83 | 3.47 | 1.71 | 1.69 | .. | .. | .. | 14.35 | 10.47 | 16.35 | 42 | 64 | 57 |
| 7.59 | | 43.33 \pm 1.81 | 35.88 \pm 1.25 | 36.75 \pm 1.54 | 3.40 | 2.06 | 0.43 | 0.74 | 4.87 | 6.13 | 14.20 | 10.07 | 15.75 | 44 | 102 | 75 |
| .. | | 41.37 \pm 1.93 | 26.82 \pm 1.39 | ..... | .. | .. | .. | .. | .. | .. | 20.40 | 15.60 | .. | 80 | 90 | .. |
| .. | | 56.25 \pm 2.03 | 41.25 \pm 1.99 | 51.25 \pm 1.40 | 5.28 | 2.03 | 4.11 | .. | .. | .. | 17.30 | 15.98 | 13.70 | 52 | 46 | 68 |
| .. | | 80.00 \pm 1.82 | 67.50 \pm 1.95 | 62.85 \pm 1.18 | 4.69 | 7.94 | 2.04 | .. | .. | .. | 18.30 | 15.85 | 12.85 | 72 | 48 | 84 |
| 9.08 | | 72.67 \pm 1.59 | 55.00 \pm 1.70 | 57.95 \pm 1.05 | 7.61 | 11.23 | 1.48 | 5.24 | 5.90 | 8.12 | 20.90 | 20.25 | 15.30 | 124 | 94 | 152 |
| .. | | 60.50 \pm 1.70 | 40.36 \pm 2.19 | ..... | .. | .. | .. | .. | .. | .. | 20.00 | 18.86 | .. | 99 | 53 | .. |
| .. | | 31.88 \pm 4.46 | 81.25 \pm 1.90 | 60.00 | 2.19 | .. | .. | .. | .. | .. | 23.00 | 19.35 | 8.77 | 19 | 74 | 8 |
| .. | | 95.83 \pm 2.89 | ..... | 82.50 \pm 2.66 | .. | 3.48 | .. | .. | .. | .. | 17.10 | .. | 10.45 | 25 | .. | 11 |
| 8.32 | | 93.00 \pm 2.73 | ..... | 76.25 \pm 2.92 | .. | 4.19 | .. | 2.14 | .. | 7.68 | 21.45 | .. | 15.05 | 44 | .. | 19 |
| .. | | 85.42 \pm 2.27 | 49.17 \pm 4.15 | ..... | .. | .. | .. | .. | .. | .. | 22.95 | 24.56 | .. | 73 | 25 | .. |
| .. | | 111.43 \pm 2.42 | ..... | ..... | .. | .. | .. | .. | .. | .. | 19.85 | .. | .. | 48 | .. | .. |
| .. | | 124.17 \pm 2.78 | ..... | ..... | .. | .. | .. | .. | .. | .. | 19.20 | .. | .. | 34 | .. | .. |
| .. | | 115.91 \pm 1.90 | ..... | ..... | .. | .. | .. | 5.82 | .. | .. | 20.40 | .. | .. | 82 | .. | .. |
| .. | | 97.50 \pm 2.53 | ..... | ..... | .. | .. | .. | .. | .. | .. | 21.40 | .. | .. | 51 | .. | .. |
| .. | | | | | .. | .. | .. | .. | .. | .. | | | | | | |
| .. | | | | | .. | .. | .. | .. | .. | .. | | | | | | |
| .. | | | | | .. | .. | .. | .. | .. | .. | | | | | | |
| .. | | | | | .. | .. | .. | .. | .. | .. | | | | | | |
| .. | | 16.25 \pm 3.46 | ..... | ..... | .. | .. | .. | .. | .. | .. | 19.65 | .. | .. | 23 | .. | .. |

Whites, for instance, are to be found in the first grade, while the Mexicans who enter school late and have difficulty in adjusting themselves to the school situation present a wider intellectual range and one more nearly representative of the average age sample. This hypothesis is supported by the facts: (1) that the difference in the performance of the Mexicans and Whites on the Detroit test, which is pronounced for the youngest age

TABLE XXVI
GRADE COMPARISONS OF THE VARIOUS SUBJECT GROUPS ON THE BASIS OF THE PER CENT OF ONE GROUP EXCEEDING THE MEDIAN TEST SCORE OF ANOTHER

| Comparison | Test | Grade | | | | | | |
|---|----------------------|-------|--------|-------|--------|-------|-------|---------|
| | | First | Second | Third | Fourth | Fifth | Sixth | Seventh |
| Per cent of CW exceeding Md. of CM..... | Pantomime..... | 53 | 65 | 65 | 66 | 70 | .. | .. |
| | National..... | .. | .. | 70 | 80 | .. | .. | .. |
| | Pintner-Cunningham.. | .. | 64 | .. | .. | .. | .. | .. |
| | Detroit..... | 83 | .. | .. | .. | .. | .. | .. |
| Per cent of RW exceeding Md. of RM..... | Pantomime..... | 67 | 66 | 66 | 68 | 84 | .. | .. |
| | National..... | .. | .. | 76 | 84 | 94 | .. | .. |
| Per cent of CW exceeding Md. of RW..... | Pantomime..... | 66 | 90 | 90 | 94 | 79 | 89 | .. |
| | National..... | .. | .. | 56 | 72 | 64 | 81 | .. |
| Per cent of CM exceeding Md. of RM..... | Pantomime..... | 75 | 90 | 89 | 96 | 86 | .. | .. |
| | National..... | .. | .. | 81 | 77 | .. | .. | .. |
| Per cent of RW exceeding Md. of CM..... | Pantomime..... | 30 | 14 | 20 | 14 | 40 | .. | .. |
| | National..... | .. | .. | 61 | 61 | .. | .. | .. |
| Per cent of CW exceeding Md. of CN..... | Pantomime..... | 71 | 91 | 72 | 86 | 73 | .. | .. |
| | National..... | .. | .. | 68 | 76 | 78 | .. | .. |
| | Pintner-Cunningham.. | .. | 60 | .. | .. | .. | .. | .. |
| | Detroit..... | 79 | .. | .. | .. | .. | .. | .. |
| Per cent of RW exceeding Md. of CN..... | Pantomime..... | 57 | 51 | 25 | 33 | 43 | .. | .. |
| | National..... | .. | .. | 59 | 55 | 65 | .. | .. |
| Per cent of CM exceeding Md. of CN..... | Pantomime..... | 69 | 82 | 57 | 76 | 53 | .. | .. |
| | National..... | .. | .. | 47 | 56 | .. | .. | .. |
| | Pintner-Cunningham.. | .. | 47 | .. | .. | .. | .. | .. |
| | Detroit..... | 47 | .. | .. | .. | .. | .. | .. |

group, varies in its degree inversely with age; (2) that the absolute variability of the performance of the Mexicans on these elementary intelligence tests is greater than that of the Whites, whereas the reverse usually obtains for equivalent age groups in the case of the Pantomime test; (3) that the absolute variability of the reaction of the Whites to these tests tends to decrease slightly with advance in age, a tendency which diverges from that usually exhibited.

In both the age- and grade-comparisons the relationship be-

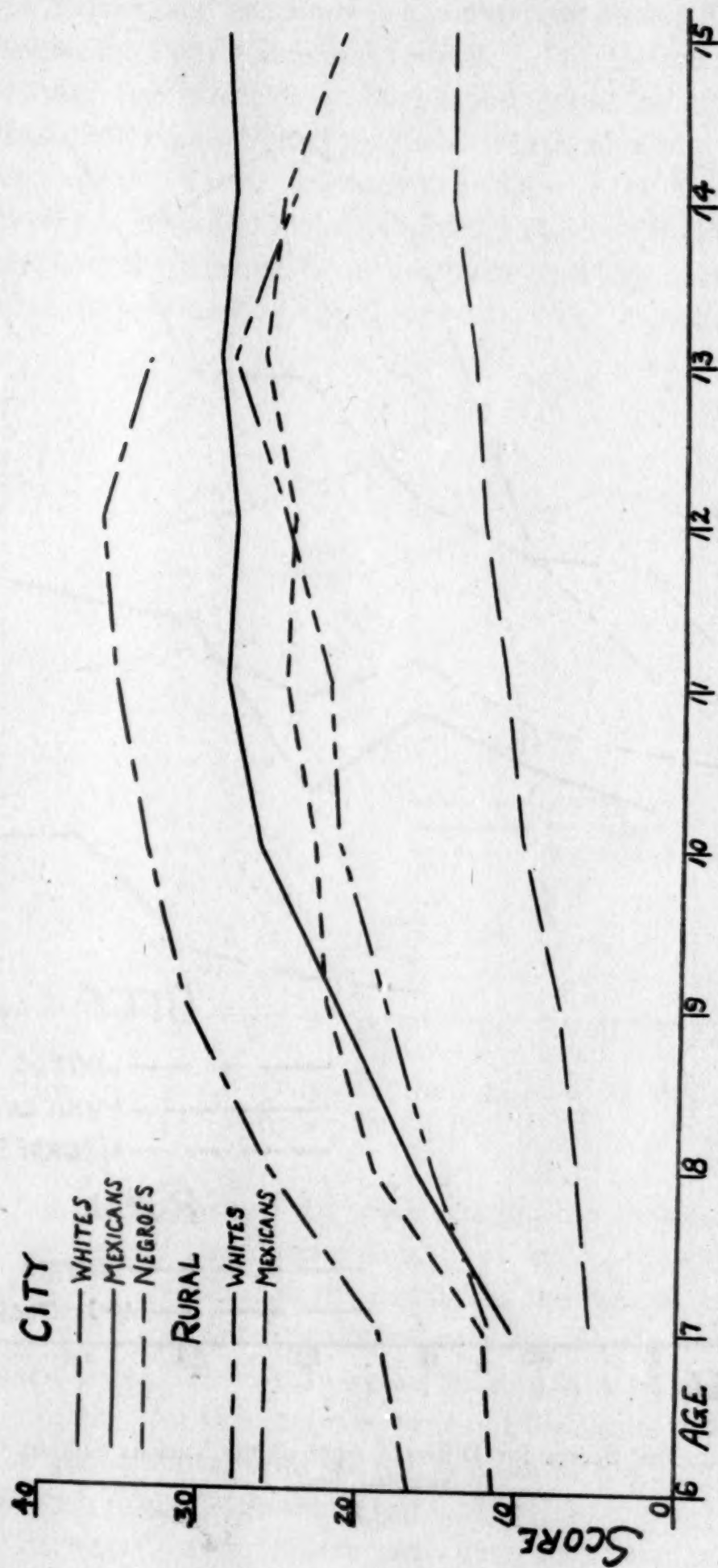


FIG. 6. Mean Test Scores for the Different Ages of the Various Subject Groups—Pantomime Test.

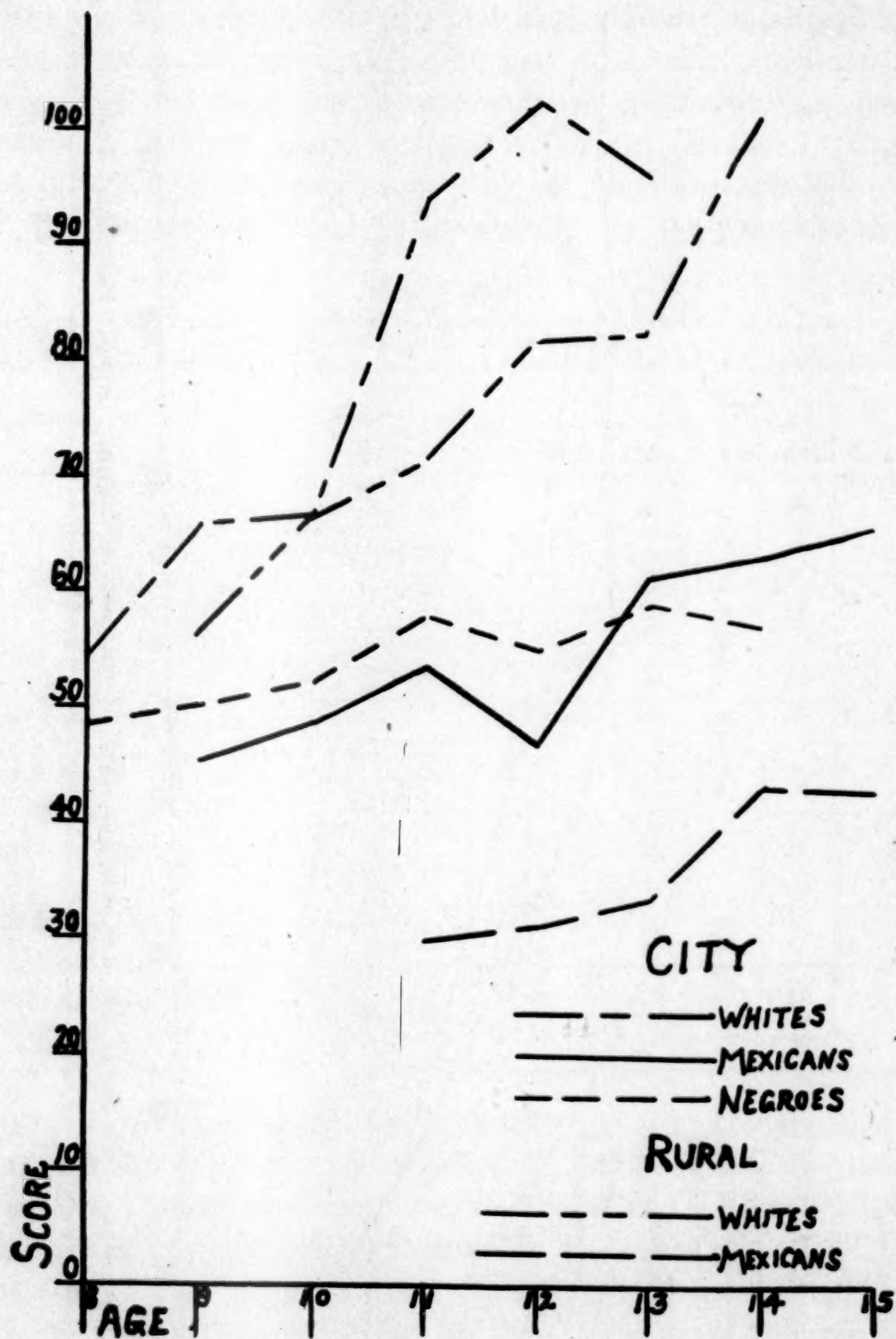


FIG. 7. Mean Test Scores for Different Ages of the Various Subject Groups—National Test.

tween the Pantomime and Pintner-Cunningham tests differs from that between the Pantomime and Detroit. The former two tests seem to offer the Mexican of the second grade, relative to the White standard, equal difficulty. This is explicable in terms of a sufficient reduction of the language deficiency of the Mexicans as they advance in school to make possible an effective handling of a relatively non-linguistic test, or the more ruthless operation of eliminative factors among them, or both. The comparisons by

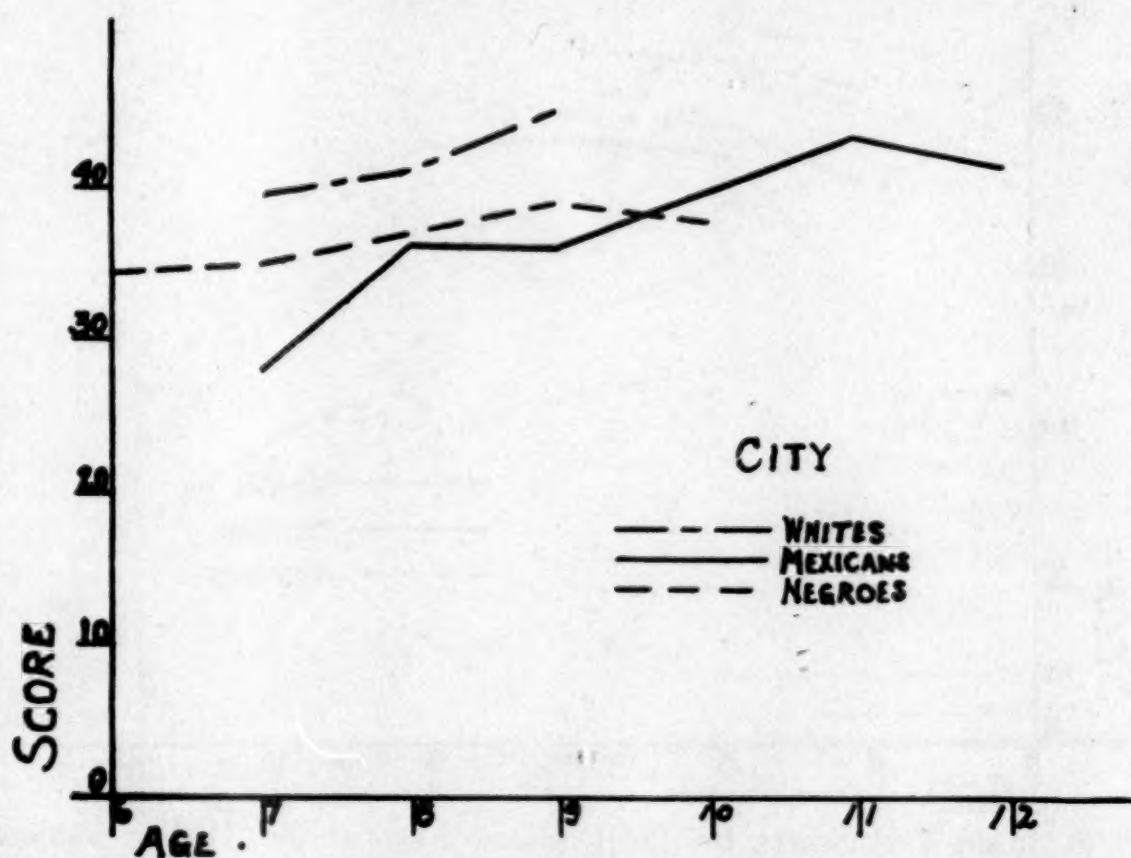


FIG. 8. Mean Test Scores for the Different Ages of the Various Subject Groups—Detroit Test.

ages of the two tests show the same relationship exhibited in one case by the Detroit-Pantomime data; and, hence, the explanation in terms of an alteration in the quality of the sample, offered to account for the Detroit-Pantomime relation, in the case of the eight-year-old pupils, we may again submit as a plausible interpretation of the fact that the nine-year-old Mexicans more nearly reach the performance level of the Whites in the Pintner-Cunningham than in the Pantomime test.

That, however, tests constructed along such similar lines as

the Detroit and Pintner-Cunningham should challenge the Mexican, relative to the Pantomime standard, in such markedly different degrees, an observation we made in the preceding paragraph, is a problem which merits some attention. Several possible solutions occur to us, and one of these is again the language factor. It seems reasonable that the second-grade Mexicans will be more skillful in the use of English than will those of the first grade, and, so, more nearly approach the White standard in the

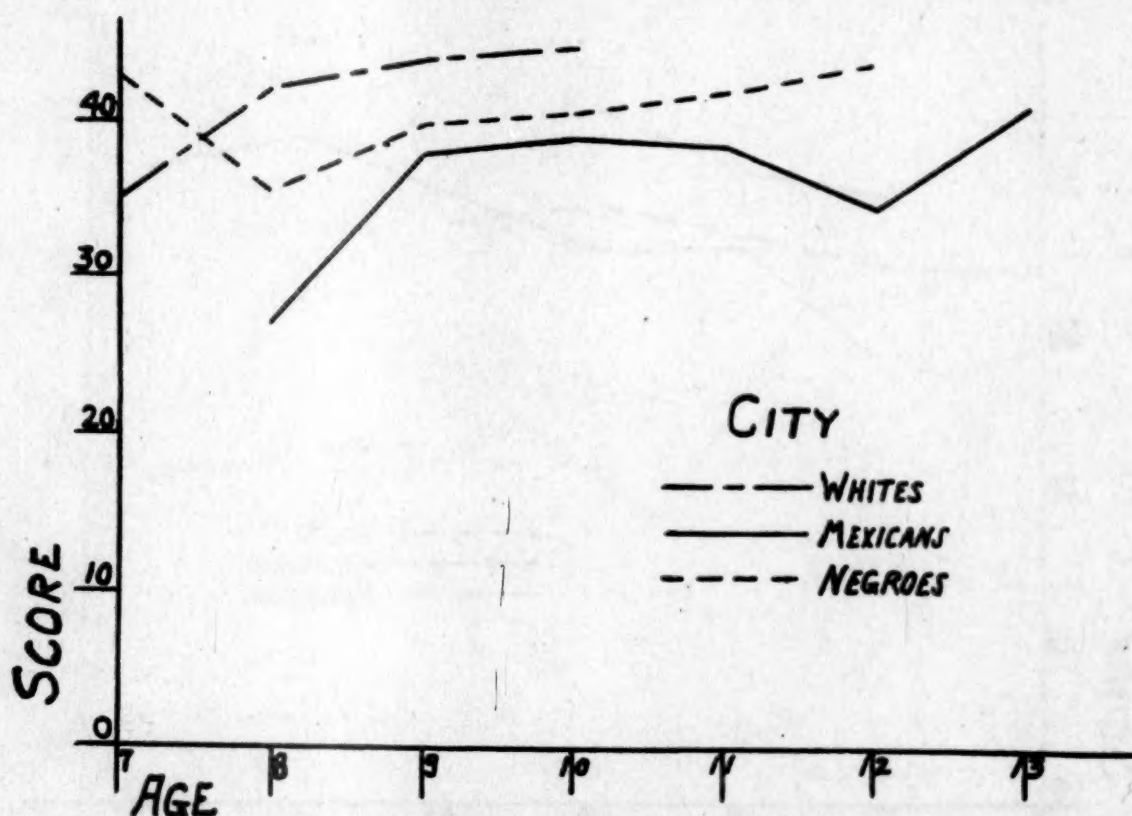


FIG. 9. Mean Test Scores for the Different Ages of the Various Subject Groups—Pintner-Cunningham Test.

former grade than they do in the latter. Then, too, the two tests may differ even in the challenge offered by their content, an hypothesis which is not supported by a superficial analysis of the tasks included in each test. Lastly, let us suggest, it is probable even that the second-grade group of Mexicans may be, relative to the White standard, a more highly selected group than the first-grade. The operation of a sampling factor seems likely, since it is known that the elimination of the Mexican in the first grade is relatively heavy, and this elimination we may assume occurs to a considerable extent on the basis of native ability.

Among the other significant facts revealed by Tables XXI and XXVI is this: The city Mexican comes nearer attaining the city-White standard than the rural Mexican does the rural-White standard. The statement applies to both National and Pantomime tests, and to both age and grade groups. This fact may be variously interpreted: (1) the urban samples of the two nationalities may include subjects more similar in native ability than the

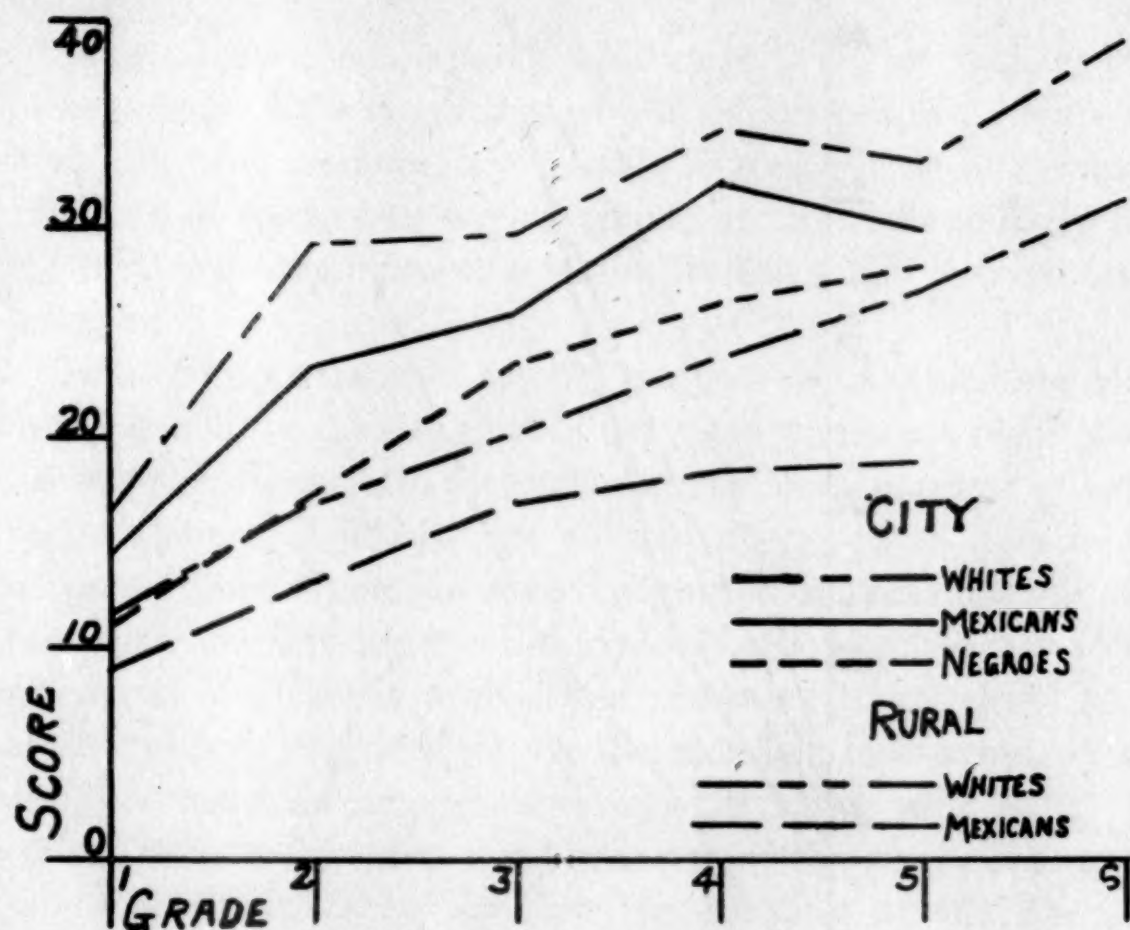


FIG. 10. Mean Test Scores for the Different Grades of the Various Subject Groups—Pantomime Test.

rural samples; (2) the opportunities of the city subjects may be more nearly equivalent than those of our rural peoples; (3) the tests may not afford the best performers (the city Whites) a chance to register the full extent of their powers, or the tests may be so weighted that the law of diminishing returns applies.

That innate factors should be to any large degree responsible for the phenomenon seems improbable, for, if the relationship is to be explained in these terms, we must assume that the socio-economic forces which attract people to, and keep them in the

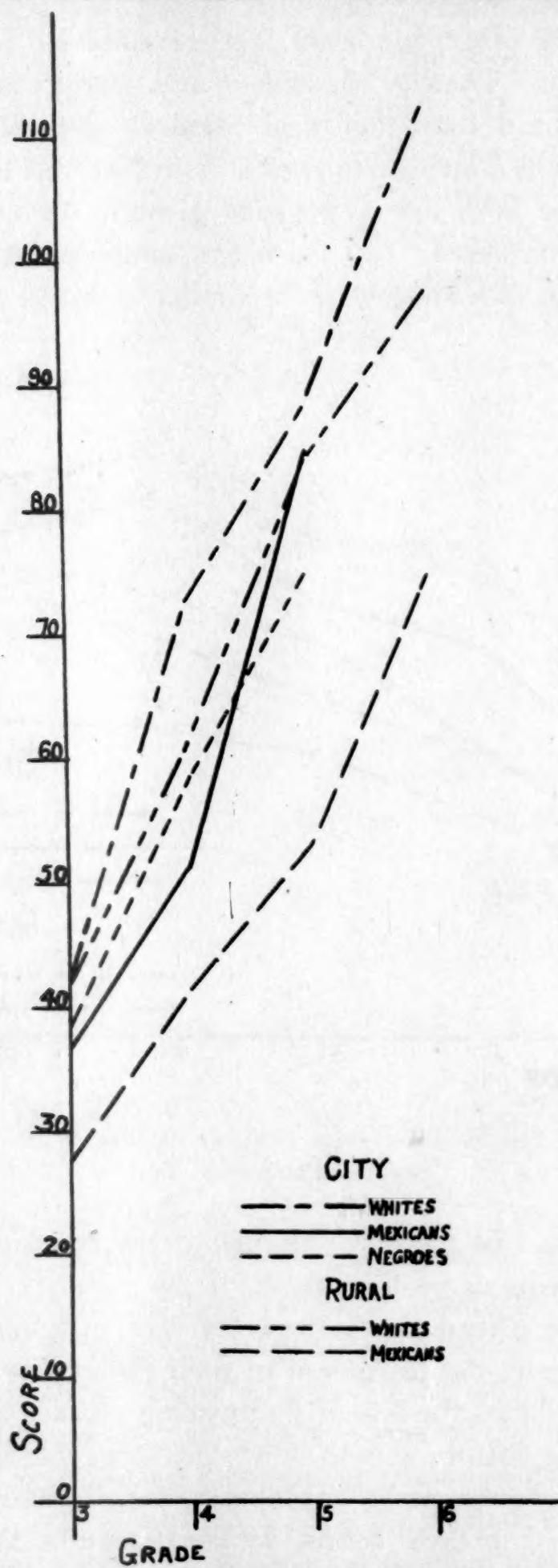


FIG. 11. Mean Test Scores for the Different Grades of the Various Subject Groups—National Test.

country, act so as to select relatively more capable Whites than they do Mexicans. Stated specifically, the rationalization would be about as follows: The least fit will tend to gravitate slowly toward a locus where competition is not severe, *i.e.*, the country. Then, if we assume competition is keener among the Whites than among the Mexicans, we may expect to find more of the relatively capable Whites retiring to seek their solace in the rural districts.

Some of these assumptions conflict to a degree with general observations on the migrations of our subject peoples. Since the Mexicans, for instance, are notably a roving type and wander freely from country to city or *vice versa*, it seems unlikely that the rural and urban sample would differ essentially in their native powers.

That the opportunities offered the two nationalities are more nearly similar in the city than in the country seems a more plausible hypothesis, since, in the rural districts, consciousness of social responsibilities is usually not so well developed as it is in the urban sections where the sheer congestion teaches that our destinies are interdependent. San Antonio, for example, has recognized the Mexican as a civic and educational problem. Much effort has been expended to give him excellent instruction, as well as other social advantages, and, in some cases, even food. Of course, none too great in number and none too conclusive are the researches which shed light on the question of the effect of nutrition and health upon intelligence; but works such as those of Pearson¹ and of Hunt, Johnson, and Lincoln² are at least suggestive.

Another fact bearing some significance in regard to the issue

¹KARL PEARSON. *On the Relation of Health to Physical and Psychical Characters in School Children*. Cambridge: The University Press, 1923. Pearson obtained a correlation between health and intelligence of $.099 \pm .014$ for boys and $.144 \pm .014$ for girls.

²JEAN LEE HUNT, BUFORD J. JOHNSON, and EDITH M. LINCOLN. *Health Education and the Nutrition Class*. New York: Dutton Co., 1921. Hunt, Johnson, and Lincoln found their malnourished groups only very slightly inferior intellectually to a control group of normal children. The subjects used were limited in number and the differences found, while consistent, were not statistically significant.

under discussion is the following: While the city subjects show a greater degree of similarity than do the rural at most ages, in the seven-year group, the one still little influenced by schooling, the performance of the rural pupils of the two nationalities seems somewhat more similar even than that of the city.

It is not unlikely, too, that the range of capabilities tapped by our measures, or perhaps the extreme difficulty or faulty weighting of the more advanced sections of the test, are active in the production of those relationships apparent especially in the case of the Pantomime test. Since no one of our subjects made a perfect score on the Pantomime test, the former hypothesis, *i.e.*, that the test is entirely too easy, can make none too powerful an appeal. It seems more probable that the test is deficient in a well graded variety of the most difficult tasks. The fact that the absolute variability of the response of the city-White group (the most capable of our subjects) to the Pantomime test decreases with advance in both age and grade—a tendency the reverse of that usually manifested—serves at least as circumstantial evidence for the latter hypothesis. It is interesting, moreover, to note at this point that while the city groups of the two nationalities tend to attain more nearly similar performance standards in the case of the Pantomime test as the age of the groups is increased, there is no evidence of any tendency for the degree of overlapping of White and Mexican National-test distributions to vary consistently with changes in age, nor does such a tendency appear in the reactions of the rural pupils to either test. Doubtless, a sampling factor in these cases is counteracting the diversifying influence of a more variable environment.

Sigmas. A consideration of the sigmas of the various age- and grade-group distributions is of some interest, not only because of the light they will shed on the issues already raised, but also because of the frequently iterated dogma that, given races whose average ability is equal, that race is socially most valuable which is the most variable, provided the variability is conspicuous in a positive direction. One genius can supposedly render society greater service than many mediocre individuals.

A comparison of the absolute variability of the age and grade

groups of Whites and Mexicans shows: (1) the rural Whites have a higher absolute variability in both Pantomime- and National-test performance, and this relation holds also in nine out of twelve possible comparisons between the city age groups furnished by these two tests (see Tables XVII to XX and XXII to XXV); (2) the standard deviations of the city grade groups of the two nationalities for these same tests are not consistently different in size, whereas the sigmas of the Detroit and Pintner-Cunningham age- and grade-group distributions are even greater in the case of the Mexicans than the Whites; (3) the city Mexicans of a given grade are more variable than the rural Whites, but the age groups show no significant differences; (4) the standard deviation of the distributions of the National scores for both peoples and the Pantomime scores of the two rural groups tends to vary directly with age; (5) as far as the urban samples are concerned, there is no consistent alteration with advance in age or grade in the ratio of the absolute variabilities of the Mexicans and Whites, except in the grade-sigma comparisons of the Pintner-Cunningham and Detroit tests (here the relative difference in the standard deviations of the two groups seems to diminish as the grade is advanced); (6) the greater the age and grade the less is the relative difference in the absolute variability of performance of the rural samples of the two nationalities with the exception of the comparisons by grades for the Pantomime test; (7) the increase with advance in age in the diversity of the responses offered by the rural-Mexican groups seems to occur more rapidly than in the case of the rural Whites.

The diversity in the variability of performance of comparable groups may be the result of: (1) differences in the native variabilities of the nationalities; (2) the more variable play of social and economic forces upon one group than another; (3) the indirect action of these forces in the selection of the school sample of the populations; and (4) the ease or very great difficulty of the test, a factor which militates against a high variability in the older and least capable samples. These factors, let us suggest, do not operate singly, a condition which, doubtless, accounts for the multiplicity of tendencies shown. A few possible interpretations

of our results will be submitted, although we have little in the way of material that will settle any one point.

The fact that the Whites, generally speaking, have a higher absolute variability than the Mexicans may indicate that our Mexican subjects are more uniformly equipped in native ability than are the Whites. Although, undoubtedly, we are dealing largely with the peon class of Mexicans, whereas we touch all classes of Whites, still we can make no inferences from this fact in regard to the fundamental intellectuality of our subjects because the nature of the relationship of social status and intelligence has never been entirely successfully demonstrated. Studies such as Downey's,¹ Terman's,² Duff and Thomson's,³ etc., have point in this connection.

Since *a priori* consideration indicates that the environment of the Whites is less uniform and more complex than that of the Mexicans, we might expect this factor to be one of the causes of the rather consistently greater absolute variability of the Whites. The greater uniformity of the reaction of the rural White to the test, as contrasted with that of the city Mexican, may also be a result of the greater variety of stimulations which the city offers. Still, it is always possible to reason that the city, because of the diversity of its appeals, selects a natively more variable group than the country. The direct action of a more diversified environment may be, furthermore, productive of the result that the standard deviation of the distribution of the National scores for both nationalities and the Pantomime scores of the two rural groups tends to vary directly with age.

Too great ease or defective test weighting probably accounts, at least in part, for the reversal of the aforementioned tendency in the case of the reaction of the city Whites to the Pantomime test.

¹JUNE DOWNEY. "Standardized Test and Mental Inheritance," *J. of Hered.*, 9, 1918, 311-314.

²L. M. TERMAN. *The Intelligence of School Children*. New York: Houghton Mifflin Co., 1919.

³JAMES F. DUFF and GODFREY H. THOMSON. "The Social and Geographical Distribution of Intelligence in Northumberland." *Brit. J. of Psychol.*, 14, 1923, 192-197.

That the city Whites of a given grade are no more variable than the city Mexicans, as they are in the age comparisons, suggests the combined operation of two or more antagonistic factors. A rather uniform environment may act so as to select a school group that exhibits a wide range, indeed, in its preparation and skills. The Mexicans, for instance, in a given grade are, doubtless, a relatively heterogeneous group, because of the irregularity of their school attendance, of late school entrance, etc., but the lack of variety in their home, church, and business life may counteract this diversifying factor, in part, and render the performance of the Mexicans in a given grade about as varied as that of the Whites who are played upon by a greater range of social and economic conditions, generally, but at the same time by more uniform scholastic influences.

The fact that the Mexican offers a wider gamut of responses to the one-grade test than do the Whites may be interpreted as a result, in part at least, of our method of designating the grade of the child. While the Detroit and Pintner-Cunningham tests were given before the mid-term promotions, the grade classification of the child was considered to be that which he had after mid-term. Since retardation for a multiplicity of rather patent reasons is more pronounced for the Mexicans in the early grades than for the Whites, one would expect a group composed entirely of Mexicans, who had been promoted at mid-term, to be more homogeneous than a corresponding group of White pupils. Then, too, since retardation of the older Whites can be attributed very largely to dullness, whereas retardation among the Mexicans is equally likely to be the result of linguistic difficulties, late entrance, etc., we may expect the variability of the Whites of a given age found in a single grade to decrease with advance in age, whereas we may look for a reverse condition or no relation at all between the size of the sigma and the age of the Mexican subjects in a single grade.

2. COMPARISON OF CITY AND RURAL GROUPS

Test Scores. The city Mexicans and Whites score much higher on both Pantomime and National tests than their respec-

tive rural groups, when the two are compared by ages, as well as by grades. (See Tables XVII to XX, XXI to XXV, and Figures 6 to 11.) The reliability of the age-group differences is attested by the fact that the reliability quotient in the case of the two Mexican groups ranges between 3.42 and 25.28 for the Pantomime test, and between 2.87 and 10.01 for the National. In the case of the White age groups, the scatter for the Pantomime is from 4.51 to 14.61; and for the National, from .18 to 6.93. The Pantomime grade-group quotients fall within the limits of 4.37 and 16.56, and of 7.23 and 18.14 in the case of the Whites and Mexicans, respectively; whereas for the National test the corresponding scatters are from .23 to 6.24 and from 4.63 to 6.30.

The number of city pupils exceeding the median rural score is usually great. The range is from 56 to 96 per cent for the age groups, and from 53 to 98 per cent for the grade (see Tables XXI and XXVI). The age and grade groups of the two socio-economic divisions show about an equal amount of overlapping, a condition especially interesting in contrast to that which obtained in the White-Mexican comparisons. No deductions in regard to the influence of opportunity can be made, however, on the basis of this contrast, since the factor of the age of the pupils for a given grade is more nearly equal in the intra-nationality than in the intra-urban or intra-rural comparisons.

We note also, again contrary to the findings in the White-Mexican comparison, that the city and rural groups of both nationalities differ less from each other in their reactions to the National than to the Pantomime test. The highly selected nature of the National-test groups may be responsible for this phenomenon. The action of the factor of selection we should expect to be most patent in the younger National-test groups and also in the rural, as opposed to the urban divisions. The nine-year-old subjects of the Pantomime groups, for instance, are drawn from grades 1 to 6, whereas the nine-year-old National-test subjects are found only in the third grade or above, since the National test was not given below the third grade. These

latter pupils, then, are those who have progressed rather regularly from grade to grade. For the Mexican, moreover, to make his way through the grades relatively unretarded, in spite of his linguistic and social handicaps is probably evidence of more real ability than a similar feat accomplished by a White student. The same statement may be slightly rephrased and made to apply to the rural as opposed to the city pupil. Hence, the National-test subjects are probably unusually intelligent, and this is especially true of the youngest Mexican group.

The experimenters, furthermore, did not always find it feasible to give the National test to certain advanced grades of rural Mexicans and, occasionally, even Whites, because the students were too few or the communication difficulties prohibitive. Since the National-test subjects then are conscripted principally from the personnel of the better class schools, this phenomenon, doubtless, functions to further raise the standard of the rural National-test groups, and so brings it about that the overlapping of city and rural distributions in the National-test *grade* groups, as well as the age, is greater than in the corresponding Pantomime.

Tables XXI and XXVI show not only that the divergence of city and rural pupils is least on the National test but also that the Whites of the two economic divisions approach more nearly the same performance level than do the Mexicans. This is true for both tests. We have already discussed the causative phenomena of this relationship when mentioning other of their manifestations, *i.e.*, when they functioned to make the city groups of Whites and Mexicans more similar than the rural. We suggested then that, while the rural Whites may be natively relatively more superior Whites than the rural Mexicans are Mexicans, this explanation seems improbable. An explanation in terms of the greater similarity of the opportunities, scholastic and otherwise, of the two White groups, as opposed to the two Mexican seems the more reasonable.

Although the city and rural Whites perform generally with a more nearly similar degree of success than do the Mexicans, the relative standing of the two groups is not a fixed one. We find that the percentage of city Whites exceeding the median

rural score on both tests tends to increase with the age of the subjects, a relationship to be expected if opportunity plays any great part in the determination of test performance. For the Mexican, on the other hand, the overlapping of the city and rural Pantomime-test age-group distributions decreases with advance in age only until the eleventh year, whereafter it again increases slightly. Doubtless, the influence of sampling factors, which we described at some length in the previous section, is sufficiently great to counterbalance, or even overbalance here, the diversifying effects of general environmental forces. In contrast to the Pantomime results, no consistent variation with age is shown in the degree of overlapping of city- and rural-Mexican National-test distributions.

In the case of the grade groups, the percentage of city pupils making Pantomime scores in excess of the median rural seems to increase with the pedagogical rank of the subjects at least up until the fourth grade and to decrease slightly, perhaps, thereafter. Since the number of cases in the advanced groups is relatively small, the representativeness of the latter tendency is somewhat questionable. Still, it seems not unreasonable that the most advanced rural pupils should be very highly selected, or the test so poorly weighted in its upper ranges that the skill of the most capable students is misrepresented. As far as the National test is concerned, the ascendancy of the city Whites over the rural seems to increase with grade, whereas for the Mexican the opposite condition obtains.

Sigmas. A description of the relative magnitudes of the sigmas of our various groups will be attempted at this point, but no detailed interpretation of the relationships will be offered, as the factors probably effective in the production of the results, as well as the general method and occasions of their operation were suggested in the previous section. A repetition of these explanations would be prolix. The standard deviations (see Tables XVII to XX and XXII to XXV) of the distributions of the Pantomime-test age-group scores are greater in the case of the city Whites eleven years or younger than they are in the case of the rural Whites. For the older White groups, the oppo-

site prevails. A similar tendency is manifested by the sigmas of the National tests taken by these groups, except that after the ninth year, rather than the eleventh, the rural groups become the more variable. An exception that presents itself is the performance on the National test of the thirteen-year-old urban-White pupils, who show a slightly higher absolute variability than the corresponding rural group.

The age-by-age comparisons of the rural and city Mexicans reveal the sigmas of the latter to be consistently the greater. Whereas, furthermore, for both country groups the size of the sigmas of the distributions of both tests increases markedly with increase in age, those of the city show no very consistent tendency to alter their size as the older pupils are dealt with. In the case of the reaction of the city Whites to the Pantomime test even a slight decrease in absolute variability with increase in age becomes apparent.

While in general the higher the grade the greater the standard deviations of the distributions of the Pantomime scores of the rural pupils, the reverse applies to the sigmas of these groups domiciled in the city. The National test, however, calls out a more varied response from the advanced city groups of both nationalities, as well as from the rural Mexicans, although the response of the rural Whites does not alter in any uniform way with an increase in the stage of school progress of the subjects.

3. COMPARISON OF CITY WHITES AND CITY NEGROES

Test Scores. With one inconsequential exception, every possible comparison between the city Whites and city Negroes offered by our tables (see Tables XVII to XX, XXII to XXV and Figures 6 to 11) shows the Whites to have the higher mean, as well as median, score. The reliability quotient for the age-group differences varies between 5.16 and 11.63 for the Pantomime test; between .43 and 14.23 for the National; between 3.53 and 4.31 for the Pintner-Cunningham; and between 2.53 and 5.36 for the Detroit. The scatter of the quotient for the grade comparisons is from 1.38 to 14.37, from .72 to 11.23, from 1.77 to 3.33, and from 1.19 to 6.16 for the Pantomime, National,

Pintner-Cunningham, and Detroit tests, respectively. The percentage of the city-White's scores in the various age and grade groups exceeding the median of the Negroes, ranges between 54 and 91 (see Tables XXI and XXVI). All of these data, then, leave no doubt that the city Whites react more successfully to the tests than do the city Negroes.

When, however, the city Negroes are compared with the rural Whites, the Negroes usually (exceptions are 7, 12, and 13 year age-groups and the first grade) excel on the Pantomime, while the Whites excel on the National test. These differences, however, are slight, in contrast to those that exist between the city-White and city-Negro subjects.

That the city Negro should outrank the rural White at all may probably be accounted for in terms of his greater age for a given grade and, perhaps, by his more ruthless elimination from school on the basis of scholastic or intellectual deficiency. This latter hypothesis is supported by the observation that it is the older and more advanced Negro groups who do rate higher than the rural-White on the Pantomime test.

The influence of the factor of scholastic selection just described is probably somewhat counteracted, however, in the case of the oldest groups, by the relatively limited range of grades from which the Negro personnel was derived. Our Negro subjects were drawn principally from the first four grades, whereas our rural-White group is constituted of pupils in the grades up to the eighth.

If the factors we have just suggested as productive of the Pantomime-test results are *bona fide* ones, then we have the further problem of accounting for the lower ranking on the National test of the city Negro as opposed to the rural White. It seems not unlikely that a linguistic deficiency of considerable degree is making itself felt. The Negroes' relatively uncultured environment, for example, would scarcely favor the development of an extensive English vocabulary, nor the acquirement of information of the sort necessary for skill in the sentence-completion or synonym-antonym test. Then, too, the very isolation of the

country-White child may cause him to read more than the city Negro.

The fact that this disadvantage of the city Negro on the National test seems to increase with age may be interpreted as the cumulative effect of environmental handicaps, but the further fact that this disadvantage does not increase also with grade indicates, probably, that at least part of the increase with age is the result of the more limited extent of the Negro grade range than that of the White.

Our attention has been diverted in the immediately preceding paragraphs from the city-White-city-Negro comparison, and to that we now return. The relative magnitude of the percentage of one race exceeding the median of another in the age comparisons and in the grade is a consideration of interest principally in contrast to a corresponding question in the White-Mexican study, which revealed that here the racial divergence was greater in the age groups than in the grade (see Tables XXI and XXVI). The city Negro, however, is equally deficient in both age and grade comparisons—a fact that would suggest strongly the functioning of an opportunity factor in test performance that is prominent especially in the case of the Mexican, did we not note that the Negro is not relatively so old for a given grade as is the Mexican. In fact, he closely approaches the White standard and, hence, has no advantage such as the Mexican has in the comparisons by grades.

The relative difficulties presented by the various tests to the city Negro, in contrast to the city White, are also not identical with those relationships revealed by the White-Mexican data. The Detroit test seems slightly more of a challenge for the first-grade Negro than is the Pantomime, if his deviation from the performance level of the White is taken as a standard of the difficulty of the test. When, however, the factor of age is equated the two tests seem to afford the Negro about the same hazards.

The Pintner-Cunningham, on the other hand, is apparently less taxing for the second-grade Negro, relative to the White standard, than is the Pantomime, but here again, when the factor of age is controlled, the Negro seems to handle the two tests equally

successfully. Whether, however, as we have previously suggested, comparing those children of the two races of a given age found within a single grade does not penalize the White somewhat more heavily than the Negro by limiting to a greater degree the White sample, is a point worth consideration.

In the intra-urban comparisons, contrary to the findings in the city-Negro-rural-White and in the White-Mexican data, a larger percentage of Whites exceed the median Pantomime score of the Negroes than exceed the median National. This we might expect, especially in the age groups, because of the highly selected nature of the Negro National-test samples. The interpretation becomes very plausible when we observe that the divergence of the two races in their reactions to the National test increases with age, and at fourteen years even exceeds the divergence found among the corresponding Pantomime-score distributions. It is also of some significance that, while the sigmas of the White National-test distributions increase with increase in the age of the group, such is not the case for the Negroes.

The overlapping of the National-test grade distributions of the two races, presents a contrast to the age-group data, in that it is not significantly less than that for corresponding Pantomime-test groups. Whereas, furthermore, the percentage of Whites exceeding the Negro National-test median increases with advance in both age and grade, this is true for the Pantomime, only with respect to the factor age, and then, only within certain limits. The fact that the tendency is not manifested in the upper age range causes us to recall that the Pantomime probably does not offer a sufficient variety nor gradation of the more difficult tasks to measure successfully the ability of the more capable Whites.

Since elimination in the Negro schools is rather heavy, the great increase with age in the relative magnitude of the Whites' success is remarkable. The more limited grade range of the Negro, however, may be partly responsible for the phenomenon. Let us mention, also, in this connection that the racial overlapping decreases with grade, only in the case of the National test, in performance on which opportunity factors weigh heavily.

Sigmas. The sigmas of our various distributions offer inter-

esting supplementary data, and hence, a brief description of the more outstanding relationships among them will be attempted. The city-Negro age groups differ with some constancy from the city-White in the degree of their absolute variability only in their reaction to the National test. Here the gamut of the Negro responses seems the more restricted. The former do seem to have responded to the Detroit test in a more varied way than the Whites, perhaps, but, since only two comparisons are available, the tendency shown does not justify any great confidence.

The standard deviation for all of the Negro test-groups, except the Pantomime, seems to vary directly with age for a few early years and then inversely, as the older subjects are employed. A possible explanation is the heavy elimination of the Negroes in the higher grades and their great retardation in the lower.

The older the city-White groups the greater the variability of performance on the National test. On the Pantomime, however, which probably is not suitable for the more advanced students, the younger groups exhibit the more varied achievement. The Detroit and Pintner-Cunningham call forth about an equal diversity of response from all of the city-White age samples.

A grade-by-grade comparison of the two races reveals that the Negroes have a consistently greater absolute variability than the Whites in their performance on the Pantomime and Detroit tests, as well as on the National in the less advanced grades, where retardation is great and the heaviest elimination has not yet begun. In the higher grades, as we have indicated, the sigma of the distribution of the National scores is less for the Negroes than for the Whites.

With the exception of the National-test distributions, the standard deviation for the White grade groups varies inversely with advance in grade. The variability of the Negro scores, on the other hand, decreases with advance in grade as far as the National and Detroit tests are concerned, shows no consistent tendency to alter with advance in grade in the case of the Pantomime test, and even increases with grade advancement in the case of the Pintner-Cunningham test.

One would expect, as we have frequently observed, a positive

correlation between variability of test performance and age, since time allows the diversifying factors to operate effectively, and between test performance and grade as well. Many factors playing upon our test groups, which we have already mentioned incidentally in our discussion, lend their weight to counterbalance this tendency. Among these, let the reader remember, are the weighting of the tests, the restriction of the talent-ranges in the extreme age groups, heavy elimination on the basis of scholastic deficiencies, and, lastly, such arbitrary selective factors as our method of designating the grade of the test.

4. COMPARISON OF CITY MEXICANS AND CITY NEGROES

Test Scores. The Mexican-Negro comparison (see Tables XVII to XXVI and Figures 6 to 11) should be of considerable interest as a contrast to our other comparisons. Whereas the two groups live under about equally unfavorable environmental conditions, one is further handicapped by his relative unfamiliarity with the English tongue. Hence the rôle of the language difficulty which a foreigner suffers in test performance should be rendered apparent.

The Negro score exceeds that of the Mexican at all ages below the tenth year in the case of the Pantomime test, and below the thirteenth, in the case of the National. With the exception of the tenth-year Detroit norms and the ninth-year Pintner-Cunningham median, the Negro age norms surpass those of the Mexicans in the two one-grade tests.

The reliability quotients for the Mexican-Negro age-group differences are relatively small, but the data do point consistently to certain relationships. The range of the quotients is from .67 to 4.22, from 0.00 to 3.20, from .76 to 1.21, and from .29 to 5.93 for the Pantomime, National, Pintner-Cunningham, and Detroit tests, respectively.

The younger Negroes, to summarize, tend to excel the Mexicans, whereas this state of affairs is reversed in the case of the older groups. It is apropos to mention, too, at this point that the tendency of the Mexican scores on the National test to exceed those of the Negroes occurs at a much later age than in the case

of the Pantomime test, and probably would never have occurred at all had the fifth-grade group of Negroes been a large and strong one.

These differences in the relative success of the two races with the Pantomime and National tests are probably a reflection of the influence of the Mexican's linguistic inabilities. This suggestion gains some cogency when we consider that the percentage of Mexicans exceeding the Negro median tends to increase with advance in age. As we have indicated in an earlier section, this language handicap which may make itself felt even in a non-verbal test such as the Pantomime, we may expect to diminish the longer the subjects have been in school.

Exceptions to the tendency just described—*i.e.*, for the percentage of Mexicans exceeding the Negro median to increase with age—are manifested in the most advanced Pantomime and Pintner-Cunningham groups. The former case may indicate that elimination is less severe among the Mexicans, who in their contact with White teachers are associated more intimately with the White school-attendance tradition. A very efficient truant officer was, furthermore, hard at work in the Mexican schools. The Pintner-Cunningham data are based upon too few cases to warrant any serious consideration of the exception they present.

The grade norms which supposedly equalize the school experience of the two races are significant in connection with this problem of the handicaps of the Mexican. The Pantomime scores for the Mexican grade groups are higher in every case than those of the Negro, but the former pupils are older and have more school experience for a given grade. The National-test scores, on the contrary, show the Mexican to be superior, only in the high fourth and fifth grade where the sampling of Negroes is probably very inadequate. It is possible, though, that here the linguistic disadvantage of the Mexican is no longer very potent.

If we shift our attention now to the problem of the relative difficulties presented by the various tests to the two races, as measured by the percentage of one race scoring higher than the median of the other, we discover that as far as grade comparisons are concerned the Detroit, Pintner-Cunningham, and National

tests are about equally taxing for the Mexican and that they are considerably more so than the Pantomime. When, however, the factor of age is equated the Detroit and Pintner-Cunningham tests are not consistently more challenging to the Mexican, relative to the Negro standard, than is the Pantomime, whereas the National test is. Had the technique of equating age in the one-grade tests not resulted in altering the quality of the general sampling of one race more than another, it is not unlikely that these would have shown themselves more difficult for the Mexican than they now appear.

Sigmas. Since a description of the variability relationships in the Negro and Mexican data have been given elsewhere, merely a brief comparative summary will be attempted here. The standard deviation of the Pantomime scores of the Negroes, with one exception, is greater than that of the Mexicans in the age groups below the twelfth year, whereafter it is less. The National test, as we might expect, because of the language involvement calls out a more varied response from the Mexican age groups than from the Negro, as does also the Pintner-Cunningham. The variability of the reaction of the two groups to the Detroit test, on the other hand, shows no consistent difference.

The size of the sigma for the Negro samples does not alter consistently with increase in age, whereas that of the Mexican seems to vary directly with age in the case of the Pantomime and Pintner-Cunningham tests. The leveling effect of language training may mask the tendency in the case of the National test, where, at any rate, it does not appear.

Within the grade groups, with the possible exception of performance on the National test, where the Mexicans are slightly more variable, there is no consistent difference in the standard deviations of the racial distributions.

The influence of grade is anything but uniform, too, in its effects upon the variability of performance of our racial groups on the various tests. The sigmas of both groups vary inversely with grade in the case of the Detroit test. The sigmas of the Pintner-Cunningham test, on the other hand, vary inversely with grade for the Mexican and directly for the Negro groups. This

condition is reversed in the case of the National test. While for the Pantomime test the sigmas of the distributions of Mexican scores decrease with advance in grade, those of the Negro show no consistent change.

5. COMPARISON OF THE MEXICAN COLOR GROUPS

Because of the great difference in social opportunity of our various subjects and because of the difficulty of getting truly representative and comparable samples of each nationality or race, it has been almost impossible to determine the rôle that native ability or so-called "intelligence" has had in the production of our results. We may, however, control with considerable success the factor of environment by limiting our investigation to the racial or nationality group itself and examining the behavior of those who have a mixed ancestry, a White-Mexican or White-Negro, for instance, in contrast to those who come from almost a pure native stock. A pedigree study, of course, is impossible, but a very rough measure of the extent of hybridization of Mexican and White or Negro and White is available—namely, the depth of skin-pigmentation. No one is aware more keenly than the authors of the deficiencies of this measure, but the measure, rough as it is, is better than none. We have consequently, on the basis of an arbitrarily chosen, yet objective color scale (color card) for the Mexican and for the Negro, classified the pupils of these races into three color groups. These groups we shall refer to as "light," "intermediate," and "dark." The color scale was in the hands of the authors as they made their judgments. Thus the danger of inaccurate memory was eliminated. The judgments were made on the basis of the pigmentation of the face which usually differed decidedly from that of the neck or hands, for instance.

Three methods of measuring the general adaptability of each of these color groups have been adopted. One method is the determination of the percentage of the personnel of each grade that exhibits each degree of pigmentation. The theory underlying this procedure is that, if the light pupils, for example, are intellectually most capable, they will survive in greater numbers in the

upper grades than will the dark, etc. Since our color measure is exceedingly crude, and since our color investigation was limited principally to the pupils of the first four grades, where the effect of the elimination of the unfit has not yet made itself keenly felt, we could scarcely expect this method to be extremely successful. Then, too, it is questionable whether it is safe to assume that there is no natural change in the depth of pigmentation with an increase in the age of the subjects. Lastly, the older pupils, especially the girls, may be addicted to the use of skin beautifiers. The authors, for instance, found it necessary to be continually on their guard in order to escape the illusion created by the use of powder.

With the exception, perhaps, of the case of the rural subjects, there seems to be no tendency for the percentage of the lightly pigmented Mexicans to vary directly with grade (see Table XXVII).

Our second method of attack was to compute the mean and median scores on the various tests of the total color groups. If the light pupils, to illustrate, are the most intelligent, they should on the average, react more successfully to the tests than those more deeply colored, unless the fact that all pupils have been chosen from equivalent grades, where a significant selective activity has had an opportunity to operate, masks a tendency that would have been apparent in a less homogeneous population.

A comparison of the scores of the total color groups of the Mexicans yields the following results: The median scores of the various test groups show none of the color groups to be consistently superior (see Table XXVIII). However, for all tests and for both rural and urban samples, with the exception of the performance of the city pupils on the Pantomime test, the mean score of the light group is higher than that of the other two. It ranks second in the case of the exception mentioned. None of the group differences is statistically significant except the difference between the scores of the light and intermediate groups on the Pantomime test. The results, then, of this procedure are largely negative. The rather consistent tendency of the mean scores of the light group to exceed those of the other color populations is, perhaps, worthy of slight consideration.

TABLE XXVII
COLOR DISTRIBUTION FOR THE VARIOUS GRADES—MEXICANS

| Grade | Total Number of Cases | | | Per cent of Total Cases | | |
|-------------------|-----------------------|--------------|------|-------------------------|--------------|-------|
| | Light | Intermediate | Dark | Light | Intermediate | Dark |
| Low First..... | 17 | 31 | 16 | 26.56 | 48.44 | 25.00 |
| High First..... | 20 | 20 | 26 | 30.30 | 30.30 | 39.40 |
| Total First..... | 37 | 51 | 42 | 28.46 | 39.23 | 32.31 |
| Total First..... | 152 | 200 | 108 | 33.04 | 43.48 | 23.48 |
| Low Second..... | 13 | 20 | 16 | 26.53 | 40.82 | 32.65 |
| High Second..... | 13 | 29 | 25 | 19.41 | 43.28 | 37.31 |
| Total Second..... | 26 | 49 | 41 | 22.41 | 42.24 | 35.35 |
| Total Second..... | 66 | 83 | 26 | 37.71 | 47.43 | 14.86 |
| Low Third..... | 16 | 15 | 14 | 35.56 | 33.33 | 31.11 |
| High Third..... | 11 | 16 | 10 | 29.73 | 43.24 | 27.03 |
| Total Third..... | 27 | 31 | 24 | 32.92 | 37.81 | 29.27 |
| Total Third..... | 36 | 58 | 21 | 31.30 | 50.43 | 18.26 |
| Low Fourth..... | 18 | 32 | 20 | 25.71 | 45.71 | 28.58 |
| High Fourth..... | 18 | 22 | 26 | 27.27 | 33.33 | 39.40 |
| Total Fourth..... | 36 | 54 | 46 | 26.47 | 39.70 | 33.83 |
| Total Fourth..... | 37 | 28 | 13 | 47.43 | 35.90 | 16.67 |
| Low Fifth..... | .... | .... | .... | .... | .... | .... |
| High Fifth..... | .... | .... | .... | .... | .... | .... |
| Total Fifth..... | .... | .... | .... | .... | .... | .... |
| Total Fifth..... | 14 | 10 | 2 | 53.84 | 38.46 | 07.69 |

TABLE XXVIII
TEST COMPARISONS OF THE VARIOUS COLOR GROUPS—MEXICANS

| Test | Color | Mean \pm P.E. Mean | Difference between Means | | | Median \pm P.E. Median | Difference between Medians | | | Sigma of Distribution | Fre- quency |
|-------------------------|---------------|-------------------------|--------------------------|--------|--------|-----------------------------|----------------------------|--------|--------|--------------------------|----------------|
| | | | P.E. Difference of Means | | | | P.E. Difference of Medians | | | | |
| | | | L I | L D | I D | | L I | L D | I D | | |
| Pantomime.....C | Light..... | 25.40 \pm .62 | 0.98 | 0.59 | 1.66 | 26.35 \pm .78 | 0.88 | 0.48 | 1.54 | 10.35 | 126 |
| | Intermediate. | 24.60 \pm .53 | .. | .. | .. | 25.46 \pm .66 | .. | .. | .. | 10.65 | 185 |
| | Dark..... | 25.90 \pm .58 | .. | .. | .. | 26.86 \pm .73 | .. | .. | .. | 10.55 | 151 |
| Pantomime.....R | Light..... | 12.53 \pm .30 | 0.16 | 0.13 | 0.05 | 11.31 \pm .38 | 0.93 | 0.75 | 0.02 | 7.85 | 313 |
| | Intermediate. | 11.95 \pm .23 | .. | .. | .. | 10.87 \pm .29 | .. | .. | .. | 6.75 | 386 |
| | Dark..... | 11.93 \pm .35 | .. | .. | .. | 10.88 \pm .44 | .. | .. | .. | 6.75 | 166 |
| National.....C | Light..... | 51.00 \pm 2.66 | 0.88 | 0.92 | 0.11 | 45.00 \pm 3.34 | 1.41 | 0.28 | 1.88 | 24.95 | 40 |
| | Intermediate. | 48.10 \pm 1.93 | .. | .. | .. | 50.82 \pm 2.42 | .. | .. | .. | 20.24 | 50 |
| | Dark..... | 47.75 \pm 2.29 | .. | .. | .. | 43.75 \pm 2.87 | .. | .. | .. | 20.95 | 38 |
| National.....R | Light..... | 39.85 \pm 1.69 | 0.51 | 1.90 | 1.52 | 35.84 \pm 2.12 | 0.56 | 0.56 | 1.02 | 22.80 | 83 |
| | Intermediate. | 38.66 \pm 1.61 | .. | .. | .. | 37.50 \pm 2.01 | .. | .. | .. | 21.95 | 85 |
| | Dark..... | 34.23 \pm 2.43 | .. | .. | .. | 33.75 \pm 3.05 | .. | .. | .. | 18.40 | 26 |
| Detroit.....C | Light..... | 38.55 \pm 1.02 | 3.68 | 1.28 | 2.48 | 37.92 \pm 1.28 | 1.88 | 0.11 | 1.83 | 8.15 | 29 |
| | Intermediate. | 33.35 \pm .98 | .. | .. | .. | 34.58 \pm 1.23 | .. | .. | .. | 8.65 | 35 |
| | Dark..... | 36.75 \pm .96 | .. | .. | .. | 37.73 \pm 1.21 | .. | .. | .. | 9.05 | 40 |
| Pintner-Cunningham....C | Light..... | 38.55 \pm 1.15 | 2.00 | 0.29 | 1.82 | 38.75 \pm 1.44 | 1.25 | 0.91 | 2.24 | 9.00 | 28 |
| | Intermediate. | 35.35 \pm 1.12 | .. | .. | .. | 36.25 \pm 1.40 | .. | .. | .. | 10.75 | 42 |
| | Dark..... | 38.10 \pm 1.02 | .. | .. | .. | 40.50 \pm 1.28 | .. | .. | .. | 8.55 | 32 |

TABLE XXIX
AGE COMPARISONS OF THE VARIOUS COLOR GROUPS—MEXICANS—PANTOMIME TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|-----|---|----------|--------------|----------|----------|----------|--------------------------------------|----------------|----------------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | above | below | above | below | above | below | | | |
| | | | | | | | | | |
| 7 | 7 14 | 6 21 | 9 5 | 15 13 | 3 2 | 3 3 | 53.84 40.00 | 37.50 27.78 | 50.00 40.00 |
| 8 | 10 11 | 10 18 | 4 9 | 8 21 | 7 12 | 6 12 | 50.00 37.93 | 33.33 30.00 | 53.84 50.00 |
| 9 | 12 9 | 7 18 | 9 24 | 14 33 | 7 7 | 10 9 | 63.16 33.33 | 39.13 42.10 | 41.18 43.75 |
| 10 | 18 22 | 14 24 | 17 25 | 16 24 | 12 13 | 15 9 | 56.25 47.52 | 51.52 51.02 | 44.44 59.09 |
| 11 | 15 13 | 9 11 | 12 22 | 16 26 | 15 8 | 9 9 | 62.50 54.17 | 42.86 45.84 | 62.50 47.06 |
| 12 | 6 19 | 3 25 | 18 27 | 15 36 | 12 14 | 11 9 | 66.67 43.18 | 54.55 42.86 | 52.17 60.86 |
| 13 | 4 21 | 3 18 | 6 18 | 12 12 | 16 7 | 15 21 | 57.14 53.85 | 33.33 60.00 | 51.61 25.00 |
| 14 | 3 18 | 0 18 | 4 18 | 5 12 | 3 7 | 5 16 | 100.00 50.00 | 44.44 60.00 | 37.50 30.43 |
| 15 | 1 11 | 2 6 | 4 8 | 5 14 | 2 2 | 6 4 | 33.33 64.71 | 44.44 36.36 | 25.00 33.33 |

TABLE XXX
AGE COMPARISONS OF THE VARIOUS COLOR GROUPS—MEXICANS—NATIONAL TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|-----|---|-------|--------------|-------|-------|-------|--------------------------------------|--------------|--------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | above | below | above | below | above | below | | | |
| 9 | 1 | 3 | 4 | 1 | 0 | 1 | 25.00 | 80.00 | 00.00 |
| | .. | .. | .. | .. | .. | .. | | | |
| 10 | 6 | 9 | 5 | 3 | 5 | 3 | 40.00 | 62.50 | 62.50 |
| | .. | .. | .. | .. | .. | .. | | | |
| 11 | 9 | 2 | 6 | 7 | 2 | 5 | 81.82 | 46.15 | 28.28 |
| | .. | .. | .. | .. | .. | .. | 33.33 | 66.67 | 100.00 |
| 12 | 1 | 2 | 7 | 5 | 2 | 2 | 33.33 | 58.33 | 50.00 |
| | .. | .. | .. | .. | .. | .. | 44.44 | 69.23 | 50.00 |
| 13 | 1 | 3 | 2 | 5 | 8 | 5 | 25.00 | 28.28 | 61.54 |
| | .. | .. | .. | .. | .. | .. | 33.33 | 22.22 | 33.33 |
| 14 | 0 | 2 | 1 | 3 | 0 | 2 | 00.00 | 25.00 | 00.00 |
| | .. | .. | .. | .. | .. | .. | 47.36 | 47.06 | 44.44 |
| 15 | .. | .. | .. | .. | .. | .. | 57.11 | 33.33 | .... |
| | .. | .. | .. | .. | .. | .. | | | |

TABLE XXXI
AGE COMPARISONS OF THE VARIOUS COLOR GROUPS—MEXICANS—DETROIT TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|---------|---|-------|--------------|-------|-------|-------|--------------------------------------|--------------|-------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | above | below | above | below | above | below | | | |
| 7..... | 6 | 3 | 5 | 9 | 2 | 2 | 66.67 | 38.46 | 50.00 |
| 8..... | 5 | 2 | 3 | 4 | 4 | 6 | 71.43 | 42.86 | 40.00 |
| 9..... | 4 | 3 | 5 | 2 | 4 | 5 | 57.14 | 71.43 | 44.44 |
| 10..... | 1 | 2 | 1 | 2 | 3 | 2 | 33.33 | 33.33 | 60.00 |
| 11..... | 1 | 0 | 0 | 2 | 3 | 2 | 100.00 | 00.00 | 60.00 |
| 12..... | 2 | 0 | 0 | 1 | 1 | 3 | 100.00 | 00.00 | 25.00 |

TABLE XXXII
AGE COMPARISONS OF THE VARIOUS COLOR GROUPS—MEXICANS—PINTNER-CUNNINGHAM TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|---------|---|-------|--------------|-------|-------|-------|--------------------------------------|--------------|--------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | above | below | above | below | above | below | | | |
| 8..... | 3 | 4 | 0 | 0 | 1 | 0 | 42.86 | 40.00 | 100.00 |
| 9..... | 3 | 1 | 2 | 5 | 4 | 2 | 75.00 | 38.46 | 66.67 |
| 10..... | 6 | 4 | 5 | 8 | 4 | 4 | 60.00 | 50.00 | 50.00 |
| 11..... | 3 | 2 | 5 | 5 | 1 | 2 | 60.00 | 33.33 | 33.33 |
| 12..... | 1 | 0 | 1 | 4 | 2 | 0 | 100.00 | 20.00 | 100.00 |
| 13..... | 0 | 1 | 2 | 2 | 5 | 4 | 00.00 | 50.00 | 55.55 |

Our third and probably most fruitful attack may be presented in the form of a question: Among the pupils of a given age, do those of the lighter hues have a larger percentage of their scores above the group median than do those who are darker? The extreme paucity of cases in many of our age-color groups is a defect in this approach which is not to be overlooked. This defect excluded, however, the method offers few difficulties, since it controls fairly well the selective effects of both age and grade which mar the two techniques previously described.

The data accruing from this third method of analysis are presented in Tables XXIX to XXXII. In 9 out of the 18 possible comparisons afforded by the Pantomime age groups, the light pupils have a larger percentage of their scores above the age medians than do their more swarthy comparisons, and in two more comparisons, the light group tie for first rank.¹ The intermediate group rank first in three companions, third in nine, and second in six, while the dark, hold the ranks first, second, and third, respectively, 5, 4, and 7 times, and tie for first rank twice.

The Detroit and Pintner-Cunningham tests show tendencies somewhat similar to the Pantomime. In 3 out of the 5 legitimate comparisons furnished by the Pintner-Cunningham data (see Table XXXII) the light group rank first and tie for first place once. The intermediate group never excel, and hold second and third place twice and thrice, respectively. The most deeply pigmented Mexicans claim third rank, once; second, twice; first, once, and tie for first, once.

The Detroit test (see Table XXXI) presents six possible comparisons and in four of these the light pupils assume first place, whereas the intermediate and dark claim only one first place each.

The results of the National test (see Table XXX) are in striking contrast to those just described, for in only 2 out of 10 chances do those with least pigmentation take first rank, and they tie for first place only twice. The other color groups each rank first, three times and tie for first, twice.

¹ Since we shall describe many of our results in terms of rank, let it be understood that we mean by "first rank," for instance, that the group so ranking has a larger percentage of its membership with scores above the median of the appropriate age than do the other color groups.

TABLE XXXIII
COLOR DISTRIBUTION FOR THE VARIOUS GRADES—NEGROES

| Grade | Total Number of Cases | | | Per cent of Total Cases | | |
|--------------------|-----------------------|--------------|------|-------------------------|--------------|-------|
| | Light | Intermediate | Dark | Light | Intermediate | Dark |
| Low First.....C | 7 | 21 | 16 | 15.91 | 47.73 | 36.36 |
| High First.....C | 14 | 45 | 32 | 15.38 | 49.45 | 35.17 |
| Total First.....C | 21 | 66 | 48 | 15.56 | 48.89 | 35.55 |
| Low Second.....C | 9 | 30 | 18 | 15.79 | 52.63 | 31.58 |
| High Second.....C | 10 | 35 | 12 | 17.54 | 61.40 | 21.06 |
| Total Second.....C | 19 | 65 | 30 | 16.66 | 57.02 | 26.32 |
| Low Third.....C | 12 | 41 | 16 | 17.39 | 59.42 | 23.19 |
| High Third.....C | 13 | 33 | 28 | 17.57 | 44.59 | 37.84 |
| Total Third.....C | 25 | 74 | 44 | 17.48 | 51.75 | 30.77 |
| Low Fourth.....C | 20 | 40 | 32 | 21.74 | 43.48 | 34.78 |
| High Fourth.....C | 18 | 47 | 39 | 17.30 | 45.19 | 37.51 |
| Total Fourth.....C | 38 | 87 | 71 | 19.39 | 44.39 | 36.22 |
| Low Fifth.....C | 4 | 4 | 3 | 36.36 | 36.36 | 27.28 |
| High Fifth.....C | 2 | 8 | 4 | 14.29 | 57.14 | 28.57 |
| Total Fifth.....C | 6 | 12 | 7 | 24.00 | 48.00 | 28.00 |

Were we to determine the average rank of each color group on the basis of the 39 possible comparisons which the results of the four tests afford, we should find that of the light pupils to be 1.77; that of the intermediate and dark 2.18 and 2.05, respectively.

The significant facts revealed by our data then are: (1) the rather uniform excellence of the light group and (2) the failure of the intermediate group to hold an intermediate position in test performance. If our theory has any significance, this latter observation is difficult to explain. Chance and the paucity of cases, in especially our light and dark samples, may be responsible for the irregularity. As the results stand, they are not decisive.

6. COMPARISON OF THE NEGRO COLOR GROUPS

The same general procedure was followed for the Negroes as for the Mexicans except, of course, that a different color scale was used. The results yielded by the analysis are similar to those presented by the Mexican data, though perhaps more clearly defined.

The percentage of light pupils in a given grade population is higher, the higher the grade, while the percentage of those mediumly and darkly pigmented varies in no consistent way with the stage of school progress (see Table XXXIII).

A study of the mean and median scores of the various total color groups discloses the fact that in all the tests, except the Pintner-Cunningham, on which the intermediate groups excel, the lightest children outstrip the others (see Table XXXIV). The intermediate and dark groups claim either the lowest or intermediate scores, that is, there is no consistency in their ranking.

While the reliability quotients are considerably higher than those furnished by the Mexican data, still they are not large. Only 5 out of the 24 quotients computed on the basis of the mean and median differences exceed 3, and 8 are less than 1. The rather uniform tendency of the light group to rank first is, however, not to be overlooked.

The least dusky of our Negro subjects succeed in placing a larger percentage of their scores above the age-group medians than do the darker in 6 out of 10 opportunities afforded by the Pantomime data (see Table XXXV). Each of the other color

TABLE XXXIV
TEST COMPARISONS OF THE VARIOUS COLOR GROUPS—NEGROES

| Test | Color | Mean \pm P.E. Mean | Difference between Means | | | Median \pm P.E. Median | Difference between Medians | | | Sigma of Distribution | Fre- quency |
|------------------------|---------------|-------------------------|--------------------------|---------------|---------------|-----------------------------|----------------------------|---------------|---------------|--------------------------|----------------|
| | | | P.E. Difference of Means | | | | P.E. Difference of Medians | | | | |
| | | | $\frac{L}{I}$ | $\frac{L}{D}$ | $\frac{I}{D}$ | | $\frac{L}{I}$ | $\frac{L}{D}$ | $\frac{I}{D}$ | | |
| Pantomime.....C | Light..... | 22.70 \pm .74 | 3.37 | 1.76 | 2.01 | 23.94 \pm .93 | 3.86 | 1.85 | 1.17 | 11.30 | 106 |
| | Intermediate. | 19.90 \pm .39 | .. | .. | .. | 19.92 \pm .48 | .. | .. | .. | 10.05 | 309 |
| | Dark..... | 21.15 \pm .49 | .. | .. | .. | 22.00 \pm .61 | .. | .. | .. | 10.20 | 198 |
| National.....C | Light..... | 58.20 \pm 2.23 | 2.50 | 2.00 | 0.69 | 56.67 \pm 2.68 | 1.36 | 0.77 | .81 | 21.05 | 44 |
| | Intermediate. | 51.90 \pm 1.18 | .. | .. | .. | 52.50 \pm 1.48 | .. | .. | .. | 18.95 | 117 |
| | Dark..... | 53.10 \pm 1.27 | .. | .. | .. | 54.25 \pm 1.59 | .. | .. | .. | 17.35 | 85 |
| Detroit.....C | Light..... | 39.45 \pm 1.03 | 3.13 | 3.34 | 0.49 | 40.71 \pm 1.30 | 2.82 | 2.61 | 0.09 | 6.50 | 18 |
| | Intermediate. | 35.75 \pm .59 | .. | .. | .. | 36.50 \pm .74 | .. | .. | .. | 7.25 | 69 |
| | Dark..... | 35.30 \pm .71 | .. | .. | .. | 36.61 \pm .89 | .. | .. | .. | 7.10 | 45 |
| Pintner-Cunningham...C | Light..... | 37.20 \pm 1.30 | 2.43 | 1.39 | 1.41 | 39.29 \pm 1.63 | 0.88 | 0.37 | 0.71 | 8.20 | 18 |
| | Intermediate. | 40.70 \pm .64 | .. | .. | .. | 40.89 \pm .81 | .. | .. | .. | 6.55 | 47 |
| | Dark..... | 39.30 \pm .77 | .. | .. | .. | 40.00 \pm .96 | .. | .. | .. | 5.35 | 22 |

TABLE XXXV
AGE COMPARISONS OF THE VARIOUS COLOR GROUPS—NEGROES—PANTOMIME TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|---------|---|----|--------------|----|------|----|--------------------------------------|--------------|-------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | | | | | | | | | |
| 6..... | 3 | 3 | 5 | 5 | 1 | 2 | 50.00 | 50.00 | 33.33 |
| 7..... | 10 | 14 | 26 | 32 | 8 | 16 | 41.66 | 44.83 | 33.33 |
| 8..... | 10 | 3 | 24 | 28 | 9 | 14 | 71.43 | 44.44 | 37.50 |
| 9..... | 8 | 7 | 25 | 22 | 13 | 14 | 53.33 | 53.19 | 48.15 |
| 10..... | 10 | 6 | 17 | 22 | 11 | 14 | 55.56 | 43.59 | 40.74 |
| 11..... | 10 | 6 | 18 | 22 | 13 | 12 | 62.50 | 52.00 | 52.00 |
| 12..... | 3 | 1 | 11 | 19 | 15 | 16 | 75.00 | 36.67 | 48.39 |
| 13..... | 4 | 3 | 3 | 12 | 16 | 7 | 57.14 | 20.00 | 69.57 |
| 14..... | 2 | 0 | 2 | 6 | 7 | 2 | 100.00 | 25.00 | 77.78 |
| 15..... | 1 | 1 | 1 | 1 | 3 | 3 | 50.00 | 50.00 | 50.00 |

TABLE XXXVI
AGE COMPARISONS OF THE VARIOUS COLOR GROUPS—NEGROES—NATIONAL TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|---------|---|---|--------------|----|------|----|--------------------------------------|--------------|-------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | | | | | | | | | |
| 8..... | 3 | 2 | 9 | 8 | 1 | 2 | 60.00 | 52.93 | 33.33 |
| 9..... | 6 | 4 | 10 | 12 | 6 | 5 | 60.00 | 45.45 | 54.54 |
| 10..... | 3 | 5 | 9 | 12 | 8 | 1 | 37.50 | 42.85 | 88.89 |
| 11..... | 7 | 4 | 13 | 14 | 7 | 10 | 63.63 | 48.15 | 41.17 |
| 12..... | 1 | 1 | 9 | 6 | 7 | 13 | 50.00 | 60.00 | 35.00 |
| 13..... | 3 | 2 | 2 | 4 | 2 | 8 | 60.00 | 33.33 | 46.67 |
| 14..... | 0 | 2 | 3 | 3 | 2 | 4 | 00.00 | 50.00 | 33.33 |
| 15..... | 0 | 0 | 1 | 0 | 1 | 2 | .... | 100.00 | 33.33 |

TABLE XXXVII
AGE COMPARISONS OF VARIOUS COLOR GROUPS—NEGROES—DETROIT TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|---------|---|-------|--------------|-------|-------|-------|--------------------------------------|--------------|-------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | | | | | | | | | |
| | above | below | above | below | above | below | | | |
| 6..... | 2 | 0 | 1 | 4 | 1 | 1 | 100.00 | 20.00 | 50.00 |
| 7..... | 7 | 4 | 16 | 25 | 5 | 9 | 63.63 | 39.02 | 35.71 |
| 8..... | 0 | 0 | 6 | 5 | 6 | 6 | 54.54 | 54.54 | 50.00 |
| 9..... | 2 | 0 | 3 | 3 | 3 | 4 | 100.00 | 50.00 | 33.33 |
| 10..... | 2 | 0 | 2 | 1 | 3 | 4 | 100.00 | 66.67 | 42.86 |

TABLE XXXVIII
AGE COMPARISONS OF VARIOUS COLOR GROUPS—NEGROES—PINTNER-CUNNINGHAM TEST

| Age | Total Number of Cases above or below Median | | | | | | Per Cent of Total Cases above Median | | |
|---------|---|-------|--------------|-------|-------|-------|--------------------------------------|--------------|--------|
| | Light | | Intermediate | | Dark | | Light | Intermediate | Dark |
| | above | below | above | below | above | below | | | |
| | | | | | | | | | |
| 7..... | 3 | 1 | 1 | 1 | 1 | 1 | 75.00 | 50.00 | 50.00 |
| 8..... | 4 | 2 | 10 | 8 | 1 | 5 | 66.67 | 55.56 | 16.67 |
| 9..... | 0 | 1 | 6 | 6 | 0 | 1 | 00.00 | 50.00 | 00.00 |
| 10..... | 2 | 2 | 3 | 3 | 1 | 6 | 00.00 | 50.00 | 14.14 |
| 11..... | 0 | 2 | 2 | 2 | 0 | 2 | 00.00 | 50.00 | 00.00 |
| 12..... | 0 | 0 | 1 | 2 | 1 | 0 | .... | 33.33 | 100.00 |

groups excels only once. In the case of the National test (see Table XXXVI), the percentage of scores above the median is greatest for the members of the light group in 4 out of 7 comparisons. The intermediates claim 2 first places, and the darks, 1. The Detroit and Pintner-Cunningham data merely repeat the same tendencies. The fairer Negroes outrank the darker, as far as the Detroit test is concerned, in 4 out of the 4 possible comparisons (see Table XXXVII). The intermediates claim no first places, but 3, second, and 1, third; while the darks rank third, 3 times, and second, once. The lights also surpass the other groups in the case of 2 out of the 5 age-group comparisons which the Pintner-Cunningham test presents, and tie for first rank in a third case (see Table XXXVIII).

The average rank on the basis of the 26 comparisons afforded by the four tests is 1.44, 2.06, and 2.44 for the light, intermediate, and dark color-groups, respectively. Hence we may conclude that success in test performance tends to vary inversely with the depth of the pigmentation in the Negro subjects. This is an argument in favor of the intellectual superiority of the Whites; but, of course, it is none too conclusive, because of the limited number of cases in most of our age-color samples.

VIII. CORRELATIONS OF THE TESTS WITH EACH OTHER AND WITH AGE AND SCHOOL EXPERIENCE.

1. STATEMENT OF THE CORRELATION PROBLEMS

Up to this point our main emphasis in the analysis of our data has been placed upon the comparison of our different subject groups, whether this comparison be in terms of pedagogical attainments and opportunities or in terms of test-score results. In this section our interest is centered on a comparison of the tests themselves. More specifically, our problem is to determine the correlation between the different tests for our various subject groups, and furthermore, to consider the influence of the factors of age and school experience upon the test-performance.

2. CORRELATION OF THE PANTOMIME WITH THE OTHER TESTS

Let us consider first the relationship of the Pantomime to each of the other three tests. The correlations have been computed by the product-moment method and are presented in Table XXXIX.

As to the relative size of the coefficients for the various subject groups, it may be seen that the Pantomime and National tests show a lower degree of relationship than do the Pantomime and Detroit, or the Pantomime and Pintner-Cunningham tests. This is true in the case of the city Whites and the city Mexicans: for the city Negro, the coefficient of correlation for the Pantomime and Pintner-Cunningham tests is identical with that for the Pantomime and National tests.

Our results indicate, then, a greater relationship between two non-verbal tests than between a non-verbal and a verbal test. This is what one would expect *a priori*, and we have reason to believe that our differences would have been much more striking under different conditions. The Detroit test, for instance, is a first-grade test, and the Pintner-Cunningham, it will be remembered, was given to pupils of the second grade only. With these restrictions our groups in the non-verbal test comparisons were less

TABLE XXXIX
INTER-TEST CORRELATIONS FOR THE VARIOUS SUBJECT GROUPS

| Tests Correlated | Measure | Subject Group | | | | |
|---|----------------------------------|------------------|------------------|------------------|------------------|------------------|
| | | C W | C M | C N | R W | R M |
| Pantomime..... National..... | r ± P.E.r..... Frequency..... | .47 ± .03 292 | .35 ± .04 269 | .29 ± .03 244 | .42 ± .03 339 | .39 ± .04 193 |
| Pantomime..... Detroit..... | r ± P.E.r..... Frequency..... | .54 ± .05 78 | .54 ± .05 102 | .56 ± .04 132 | ..... | ..... |
| Pantomime..... Pintner-Cunningham..... | r ± P.E.r..... Frequency..... | .57 ± .04 124 | .41 ± .06 96 | .29 ± .07 87 | ..... | ..... |

heterogeneous than those in the Pantomime-National comparison, since the National test was administered to third, fourth, fifth, and, with some groups, sixth-graders. Statisticians have pointed out repeatedly that variations in the range and character of distributions affect the size of the coefficient, even though the relation between the two measures remain the same. We have every reason to assume, then, that the correlations between our non-verbal tests would have been higher, and hence our differences more conspicuous, had we had a greater range of grades included in our test groups.

As to the comparison of our coefficients in terms of subject groups, we find the ranking practically the same, whether we consider the inter-test correlations singly or the mean of the three. Thus the city Whites are superior to the city Mexicans in two inter-test comparisons and identical in one. The city Mexicans are superior to the city Negroes in two out of three inter-test comparisons, the advantage in the one case for the Negro being very slight. The only inter-test comparison that can be made in the case of the rural subjects reveals the rural White superior to the corresponding Mexican group. If we obtain for each subject group the arithmetic mean of the three inter-test correlations, we find that the city Whites head the list with a coefficient of .53, the city Mexicans follow with a coefficient of .43, and the city Negroes rank last with a coefficient of .38. The superiority of rank in the case of the city Whites is due mainly to the high correlation, relative to those of the Mexican and Negro, of the Pantomime and National tests.

Why the coefficient in the case of the Whites is higher than that of the Mexicans and the Negroes is a matter for interpretation, and several possibilities suggest themselves. It may be that, in the case of the Whites, factors likely to be detrimental are eliminated, and that therefore intelligence has a greater chance to play. The difference may be due to an inequality of sampling. The Whites, it will be remembered, were selected from the third, fourth, fifth, and sixth grades, the Mexicans from the third through the fifth, while most of the Negroes were drawn from the third and fourth grades. Thus our sample of older Mexicans and of Negroes might represent a narrower intellectual range than

that of the Whites. As a third possibility, let us consider the rôle of language, as a factor that differentiates the groups. If the understanding and use of the English language contribute directly to success on the National test, and if we may assume that these achievements are due wholly or in large part to training and social opportunity, then we shall have to grant that the advantage is on the side of the White, and that the disparity in the type of performance demanded by the two different tests is less in their case.

The mean of the correlation coefficients for the Negro group not only falls below that of the Whites, but of the Mexicans as well. The correlation between the Pantomime and Pintner-Cunningham tests seems unreasonably low in view of the fact that the Pantomime and Detroit coefficient is .56. It is rather significant, however, that the sigma of the Negro distribution with the Detroit test is high in comparison to the Mexican distribution with the Pintner-Cunningham test. In this latter case, on the other hand, the sigma of the Negro distribution is relatively low.

That the Negroes' Pantomime-National correlation is low, relative to the Mexicans', may also be due to a difference in homogeneity of the two groups. It has previously been mentioned that the range in the case of the Mexicans extended over the third, fourth, and fifth grades, while that of the Negroes was limited to the third and fourth, with a bare representation in the fifth. Another possible interpretation, however, suggests itself. It will be remembered from the discussion of our test results that the Negroes excel the Mexicans on the National test up to a certain point in their development, or perhaps training, and then the relationship becomes reversed in favor of the Mexicans. In other words, it is conceivable that in the higher grades (fourth and fifth) the city Mexican may be less handicapped by the language factor than is the Negro. If such is the case, the lack in equality of tasks of the two tests would weigh heavily against the Negro, since the subjects taking both the Pantomime and National tests are third, fourth, and fifth graders.

The city and rural correlations are still to be considered. It will be seen from the table that the correlation between the Pantomime

and National tests is lower for the rural Whites than for the city Whites; but, on the other hand, the corresponding correlation for the rural Mexican is higher than that for the city Mexican. In both cases the city-rural discrepancies are so slight that it is difficult to decide whether they are real or due merely to chance factors. The experimenters have, however, remarked from time to time that, although the Pantomime test does not require the use of language either in the giving or in the taking, social experience, social concepts, and indirectly a language factor, all play a part in the understanding of the test situation. What we mean is this: the American child, we may assume, is familiar with the objects pictured in this test and, furthermore, he has labeled them with a name. This above assumption does not hold in the case of the Mexican, especially of the rural Mexican. To be specific, the missing shoe button on the practice sheet of the Pantomime test is a normal state of affairs for the rural Mexican. Again, the picture of the modern cooking-range to which the child is supposed to add the missing stove pipe, is, without doubt, a rare object in the life of a rural Mexican. It is very doubtful, in fact, if there was a cooking-range in the hut of a single child in any rural Mexican school visited. We might argue, then, that a greater relationship between the Pantomime and National tests is apt to result for the rural Mexican than for the city Mexican. The rural children who lacked the school accomplishments which the National test brings into play, were also deficient in certain social experiences which successful performance on the Pantomime test demands.

The object experience of the city Mexican, on the other hand, is much more like that of the city White. The same may be said with regard to the rural White; the objects and situations suggested in the Pantomime test are about equally familiar to the White child, whether he live in the city or in the country. Therefore, we should expect the Pantomime-National correlation coefficient of the rural Whites, if it differed at all from that of the city Whites, to be lower, since the formers' training or skill in the use of language is apt to be less.

TABLE XL
CORRELATION OF TEST PERFORMANCE WITH AGE AND SCHOOL EXPERIENCE FOR THE VARIOUS SUBJECT GROUPS

| Items Correlated | Measure | Subject Group | | | | |
|--|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | C W | C M | C N | R W | R M |
| Pantomime..... and Age..... | $r \pm P.E.r.$ Frequency..... | .53 \pm .01 594 | .40 \pm .02 629 | .41 \pm .02 611 | .12 \pm .03 339 | .12 \pm .05 193 |
| Pantomime..... and School Experience..... | $r \pm P.E.r.$ Frequency..... | .53 \pm .02 584 | .44 \pm .03 448 | .48 \pm .02 591 | .20 \pm .04 303 | .33 \pm .04 190 |
| National..... and Age..... | $r \pm P.E.r.$ Frequency..... | .46 \pm .03 294 | .35 \pm .04 270 | .09 \pm .04 259 | .40 \pm .03 341 | .33 \pm .04 194 |
| National..... and School Experience..... | $r \pm P.E.r.$ Frequency..... | .62 \pm .02 289 | .50 \pm .04 129 | .40 \pm .04 256 | .65 \pm .02 304 | .48 \pm .06 190 |
| Detroit..... and Age..... | $r \pm P.E.r.$ Frequency..... | .31 \pm .07 78 | .42 \pm .05 102 | .27 \pm .05 134 | ..... ..... | ..... ..... |
| Detroit..... and School Experience..... | $r \pm P.E.r.$ Frequency..... | .27 \pm .07 77 | .30 \pm .06 101 | .21 \pm .06 134 | ..... ..... | ..... ..... |
| Pintner-Cunningham..... and Age..... | $r \pm P.E.r.$ Frequency..... | .46 \pm .05 126 | .29 \pm .06 101 | .19 \pm .07 88 | ..... ..... | ..... ..... |
| Pintner-Cunningham..... and School Experience..... | $r \pm P.E.r.$ Frequency..... | .59 \pm .04 126 | .23 \pm .06 101 | .10 \pm .07 88 | ..... ..... | ..... ..... |

3. CORRELATION OF TEST PERFORMANCE WITH AGE AND SCHOOL EXPERIENCE

The next problem that presents itself for consideration is the relationship of certain factors, such as chronological age and school experience, to the different tests. Table XL shows these correlations for the various subject groups. In comparing the relationship of our two factors, age and school experience, to the different tests, it is necessary to restrict this comparison to one test at a time rather than to note the relative influence of these factors upon the four different tests. To be more specific, we cannot ask whether school experience has more in common with the Pantomime, National, Detroit, or Pintner-Cunningham tests because the range of the distribution varies with each test; that is, the first five or sometimes six grades, the first three, the first, and the second, respectively. We can, however, legitimately ask this question: Has school experience or age more in common with the Pantomime test, and does this relationship hold for the various subject populations? And, in like manner, the same question may be asked in regard to each of the other three tests.

The main results of Table XL may be summarized as follows:

1. With the Pantomime test, age and school experience show about the same degree of relationship in the case of the city populations; with the rural groups, school experience seems more closely related to the test than does age.

2. With the National test, school experience correlates higher than does age, and this is true for all subject groups.

3. With the Detroit test, age shows a slightly higher relationship than does school experience.

4. With the Pintner-Cunningham test, age correlates higher than does school experience for two groups, whereas the reverse is true for one group.

That the factor of school experience has much in common with performance on the National test is rather forcibly brought out by these data. This same fact may be shown by another method of attack—namely, the method of “partial” correlation, by which we may “hold constant” or “eliminate” these factors and note which has the most effect upon reducing the original correla-

tion. Let us illustrate with the city White group. The correlation between the National test and age is .46. Holding constant the factor of school experience reduces the coefficient to .15.¹ The correlation between the National test and school experience is .62, and holding constant the factor of age lowers the coefficient to .49. Thus the first correlation is reduced 3.2 times as much as the second.

Since age and school experience as we deal with them are not factors which are mutually exclusive, but the former is an essential part of the latter, eliminating by the partial correlation technique the effects of the latter eliminates at the same time a part of the effects of the former. Hence, the interpretation of our findings is difficult. It seems not unlikely, however, that the difference in content between the National and the other tests used is a factor in our results. All of the tests, as has been pointed out repeatedly, demand experience upon the part of the persons submitting to them; but the National test, more than the others, calls for the sort of experience one acquires in school. This must not necessarily be interpreted to mean that the non-verbal tests are better measures of intelligence than are the verbal ones; there may be inadequacies in the former that outweigh those of the latter. Certain difficulties such as the influence of social environment upon the performance in non-verbal tests, and the fact that the Pantomime test becomes too easy for the older White children have been mentioned previously. The point we are emphasizing here is merely the effectiveness of this factor in certain types of intelligence tests.

With the National test, under the conditions of our experiment, the factor of school experience seems to be considerably more effective than that of age. It is obvious, then, that such a type of test might penalize very heavily any subjects corresponding to the norm in age but deficient in school experience. It is important, then, to equate for pedagogical opportunity, if any predictions are

¹ The partial correlations have been calculated by the use of the following formula from Yule, G. N., *Introduction to the Theory of Statistics*, p. 238:

$$r_{12.n} = \frac{r_{12} - r_{1n}r_{2n}}{(1 - r_{1n}^2)^{1/2} (1 - r_{2n}^2)^{1/2}}$$

to be based upon the test results. In many instances, a grade norm will help us out. This device, however, especially for a comparison of diverse groups, must be considered far from perfect, for grade equality does not necessarily mean equality of school experience or school opportunity.

That our different groups react to the various tests with different degrees of success is clear; the reason for this is not so obvious. With different racial, national, and socio-economic groups the environmental factors are so diverse that any generalization as to causation would be hazardous.

IX. SUMMARY

The more important facts brought out by our group comparisons may be summarized as follows:

1. The city Whites are younger, in the grade-for-grade comparisons, than are the city Mexicans or the city Negroes.
2. The city Negro is younger for his grade than is the city Mexican.
3. The city groups, whether White or Mexican, are younger for their grades than are their respective rural groups.
4. The ranking of our groups in terms of variability of age-grade achievement is as follows: the rural Mexican is most variable, the city Negro next, the city Mexican third, the rural White fourth, and the city White least.
5. The comparison of our groups with respect to school-experience records, shows larger and more consistent differences when the comparisons are based on age rather than on grade attainment.
6. The Mexicans, both city and rural, have spent less time in school for their age than have the corresponding White groups.
7. The city Negro has, on the whole, less school experience for his age than has the city White, but more than the city Mexican.
8. The city groups, whether White or Mexican, have more school experience than have the corresponding rural groups of the same age.
9. The Whites, compared by ages and grades with the Mexicans in corresponding socio-economic divisions, show the more successful reaction to all of the tests. The differences between the grade groups of the two nationalities are, on the whole, less than those between the age groups.
10. The National test is consistently more difficult for the Mexicans, as compared with the Whites, than is the Pantomime. The same may probably be said of the Detroit test also.
11. The city Mexican more nearly attains the city-White standard on the tests than does the rural Mexican the rural-White standard.

12. The city Mexicans excel the rural Whites, as far as performance on the Pantomime test is concerned. This superiority is apparent in most of both age and grade comparisons. On the National, the distinctly linguistic test, however, the rural Whites excel the city Mexicans.

13. The city groups, whether Mexican or White, amass higher scores on all of the tests than do their respective rural groups. Age- and grade-group differences are about equally significant.

14. The city groups differ less from the rural in their performance on the National test than on the Pantomime.

15. City and rural Whites approach more nearly the same standard of test performance than do city and rural Mexicans.

16. The city-Whites' scores surpass the city-Negroes' in all comparisons. The age and grade groups show about equal differences.

17. A larger percentage of city-Whites' scores exceed the median Pantomime score of the city Negroes than exceed the median National.

18. The city Negro outcores the rural White on the Pantomime test. The reverse relationship obtains for the National test. These differences are slight.

19. When compared by ages, the younger Negroes outrank the Mexicans on all tests. The opposite holds for the older groups.

20. All grade comparisons show the city-Mexicans' scores on the Pantomime test to be higher than those of the Negro. The Negro grade groups, however, tend to excel on the National test.

21. The absolute variability of our groups seems to be a function of age, grade, test, method of sample selection, etc. Speaking very generally, we may say that the Whites seem to have a greater absolute variability than the Mexicans, and the city pupils (especially the younger) seem more variable than the rural.

22. The most lightly pigmented Mexicans tend to react more successfully to the tests than do the darker Mexicans. Our results, however, are not very decisive.

23. The lighter the Negro the better, usually, his performance on our tests.

24. The correlations between two non-verbal tests tend to be higher than those between a verbal and a non-verbal test.

25. The correlations of the tests with age and school experience are consistently positive for every subject group.

26. The degree of correlation of the tests with age and school experience varies with the test and with the subject group.

27. With the National test, school experience correlates more highly than does age, and this is true for every group.

X. APPENDIX

Since it has been the common practice when engaging in a comparison of the variability of groups to state the results in terms of the coefficient of variability (Pearson's formula is $\frac{100\sigma}{M}$; Thorndike's is $\frac{100 \text{ M.D.}}{Md}$), the reader may request some

comment in regard to the omission of this measure in the data presented in the body of our discussion. For the benefit of those who may have an interest in this question, tables describing the relative variabilities in test performance (computed according to the Pearson formula) are included in this appendix. Our reasons for dispensing with the aforementioned statistical tool are summarized briefly in the following statements:

1. The tests applied to the various racial groups were identical.
2. The time allotted each performer for any given section of the test was constant.
3. Since we can not assume that the quality measured in each group (Mexican, Negro, or White intellect) is not of the same structural order, but find this among the items to be demonstrated, the use of a tool justified only by such an assumption seems questionable.
4. The zero of the scale is not the zero of the quality measured.
5. The sigmas bear out the tendencies shown by the range and by the comparisons of the absolute variabilities of groups which have equivalent measures of central tendency.
6. We have no interest in individual comparisons, nor have we any interest in propagandism which would make necessary an adherence on our part to relative categories.
7. Since the selective and general environmental factors playing upon our various groups are so manifold and their *modus operandi* so obscure, as is also the influence of the weightings of the tests in their various ranges, any assumption that a statement of variability in relative rather than absolute terms will bring us in closer contact with native or genetic factors is equivocal, to say the least.

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